

FIG. 1A

+

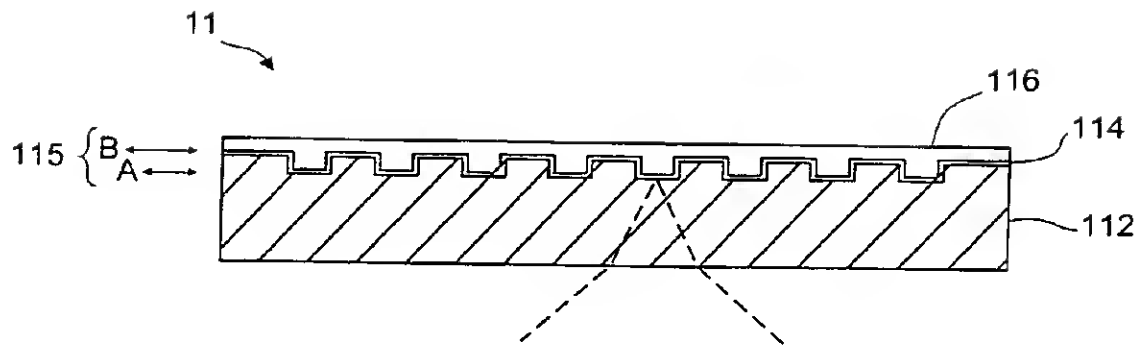


FIG. 1B

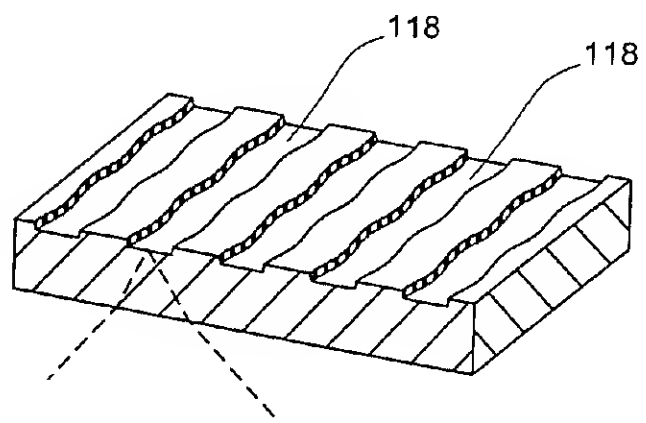


FIG. 1C

+

+

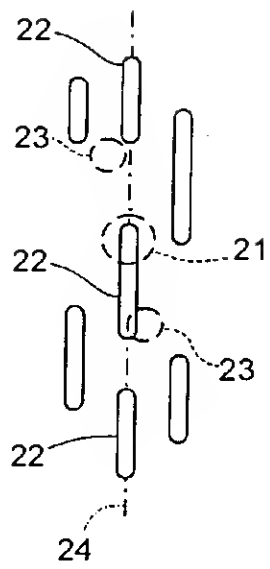


FIG. 2A

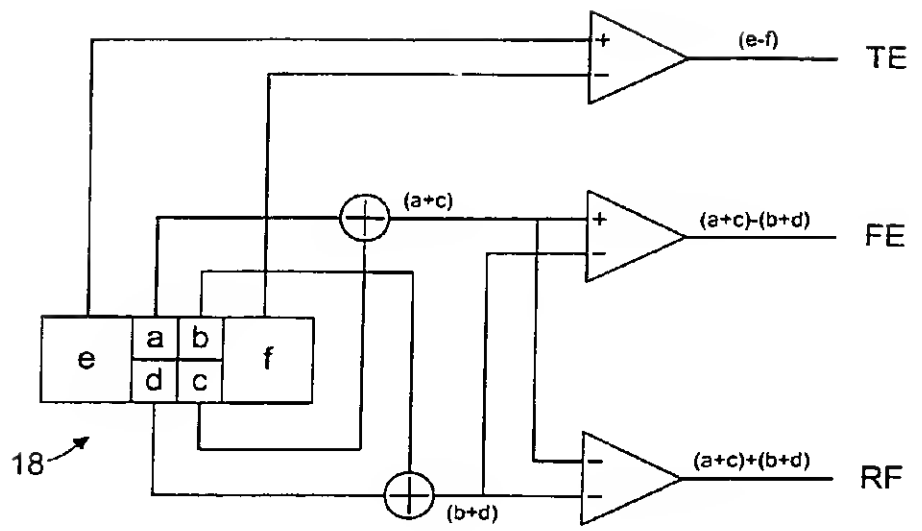
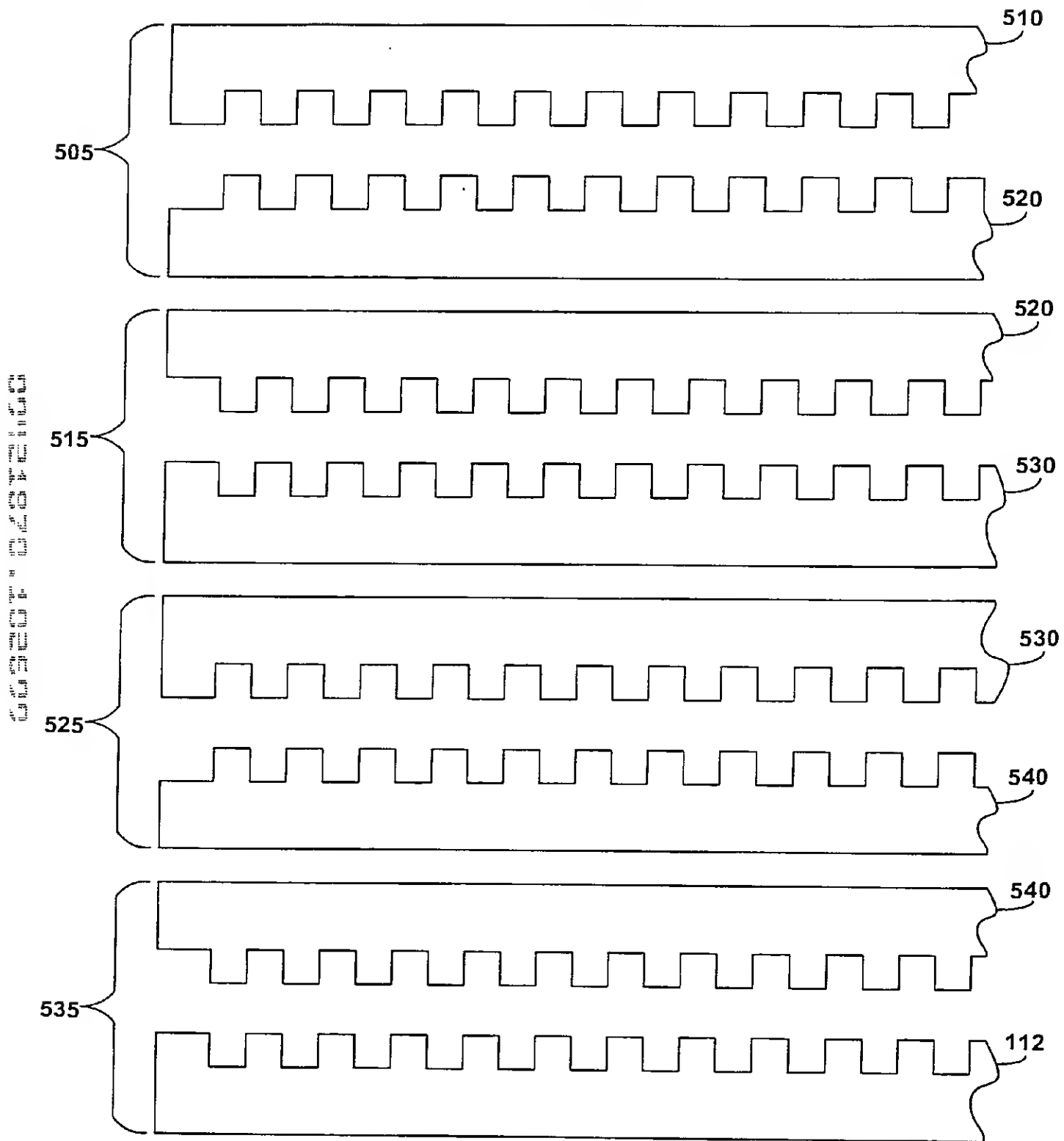


FIG. 2B

FIG. 2A

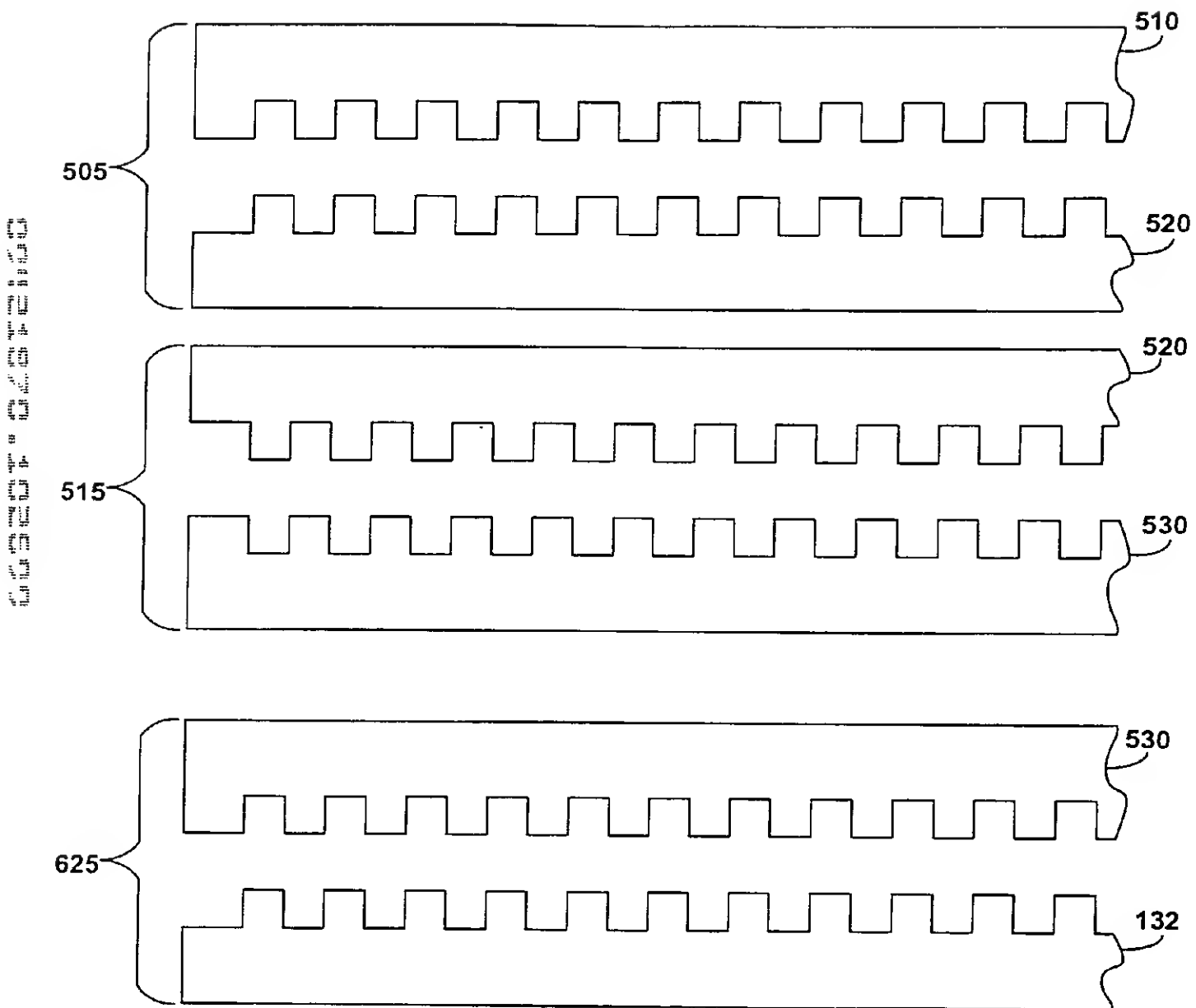
+

FIG. 3A



+

FIG. 3B



+



FIG. 3C

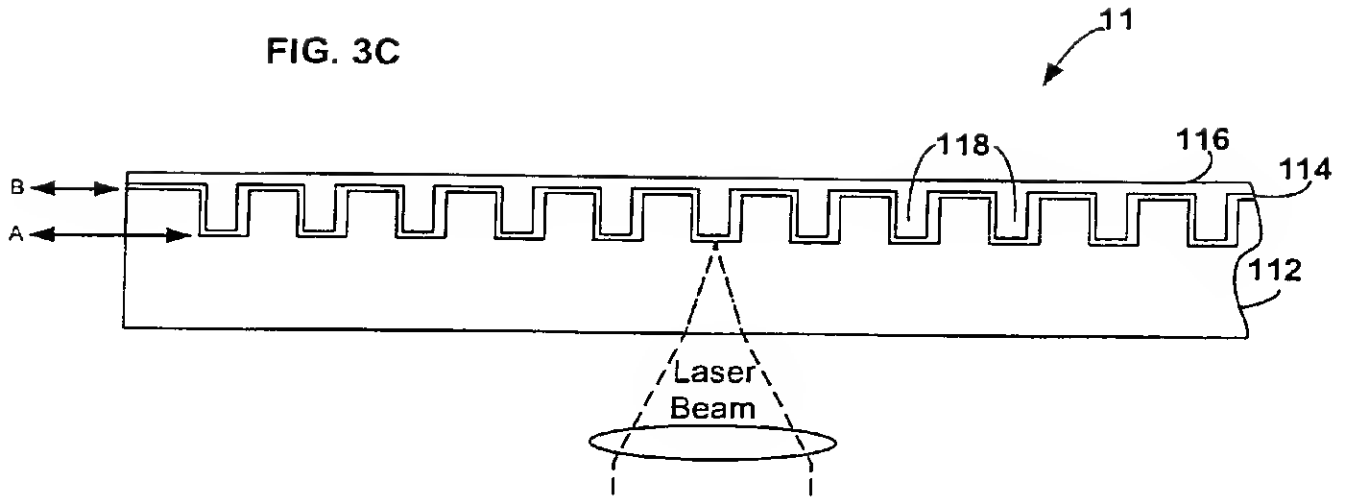


FIG. 3D

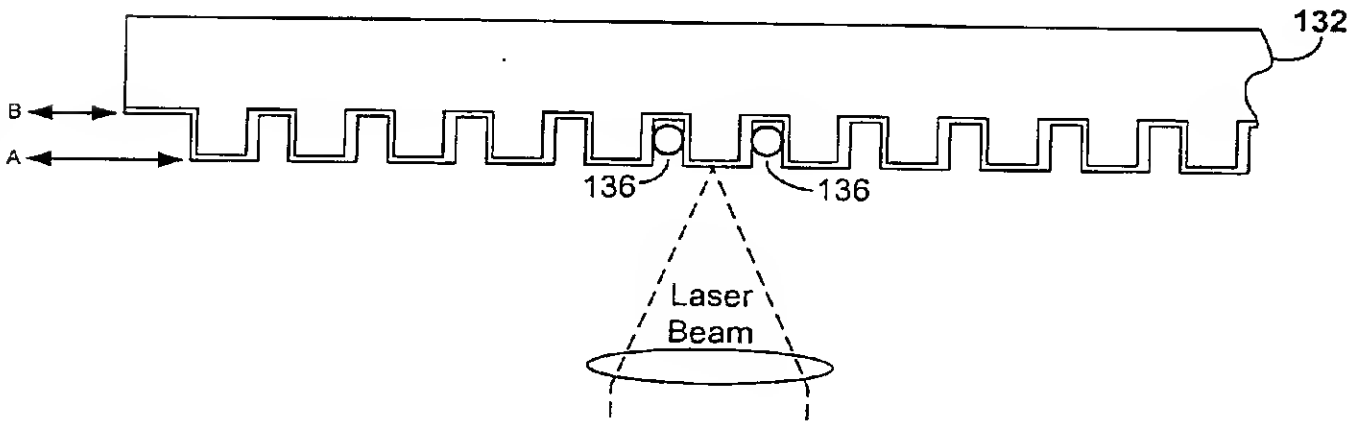
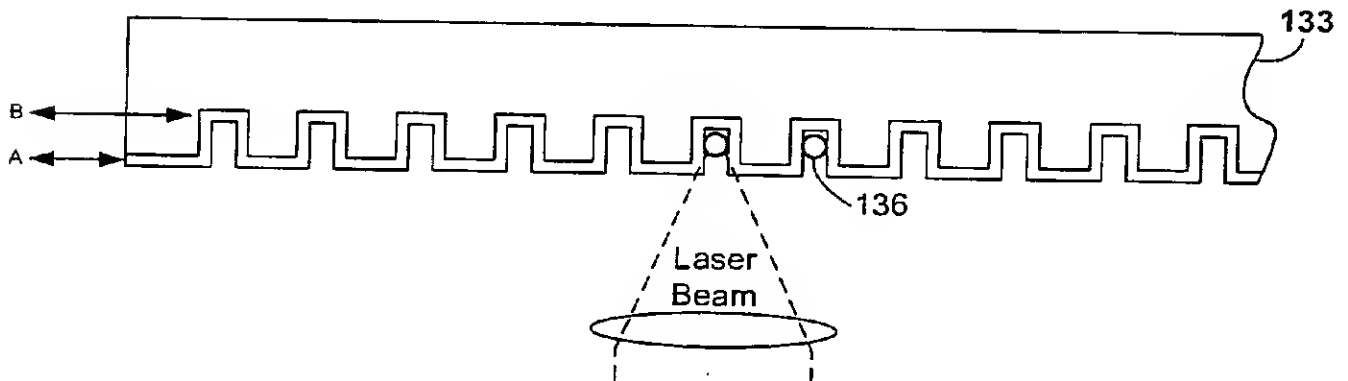


FIG. 3E



+

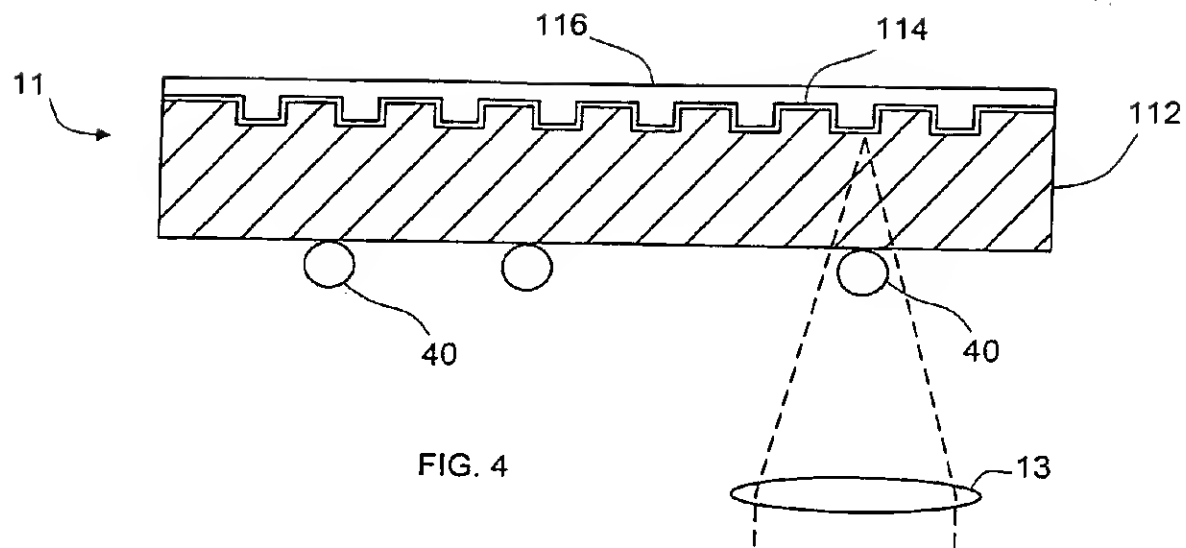


FIG. 4

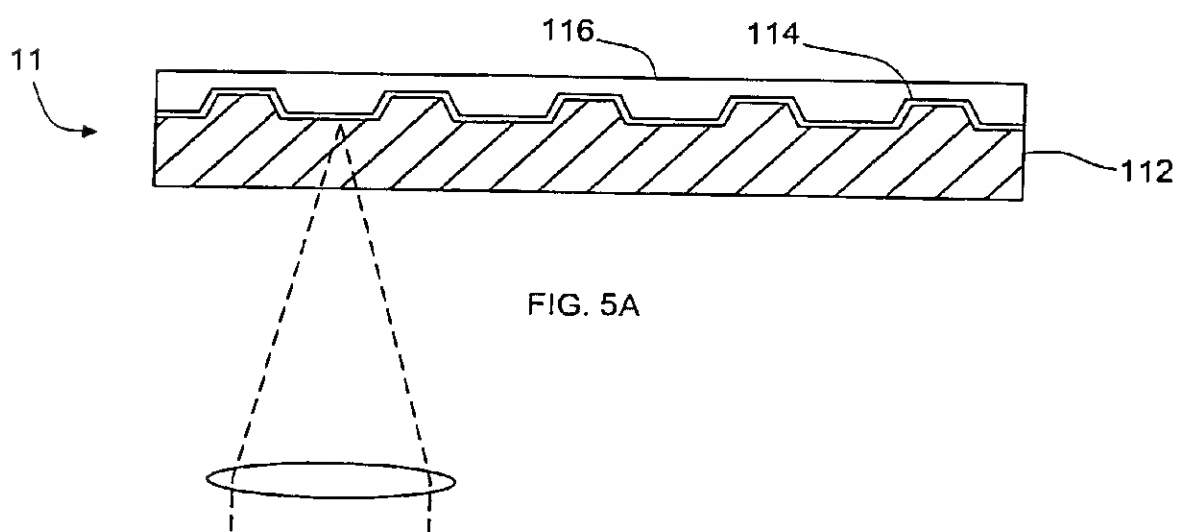


FIG. 5A

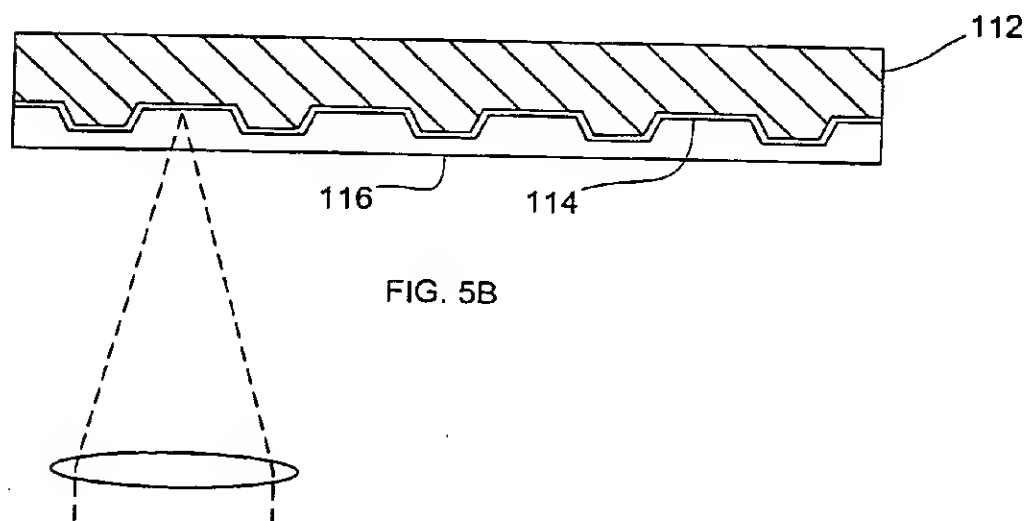


FIG. 5B

+

+

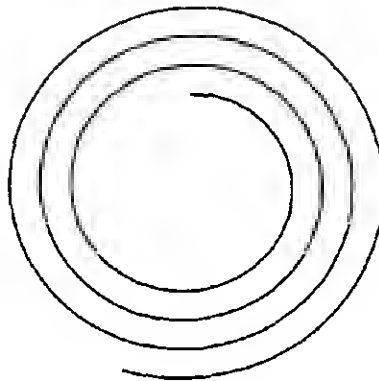


FIG. 5C

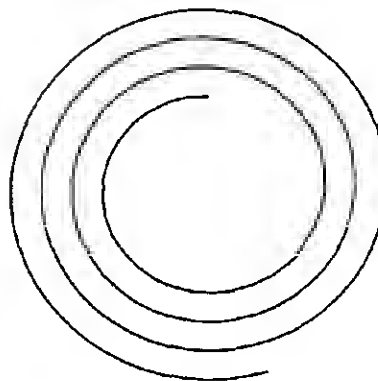


FIG. 5D

+



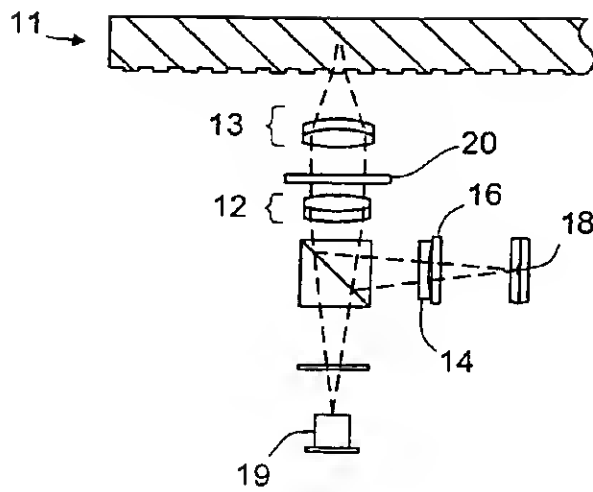


FIG. 6A

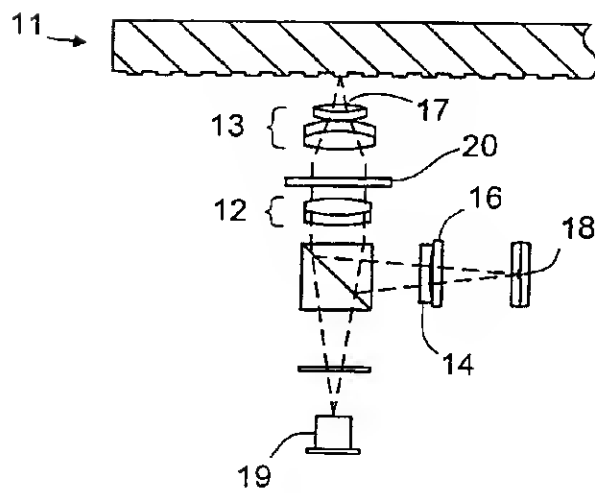


FIG. 6B

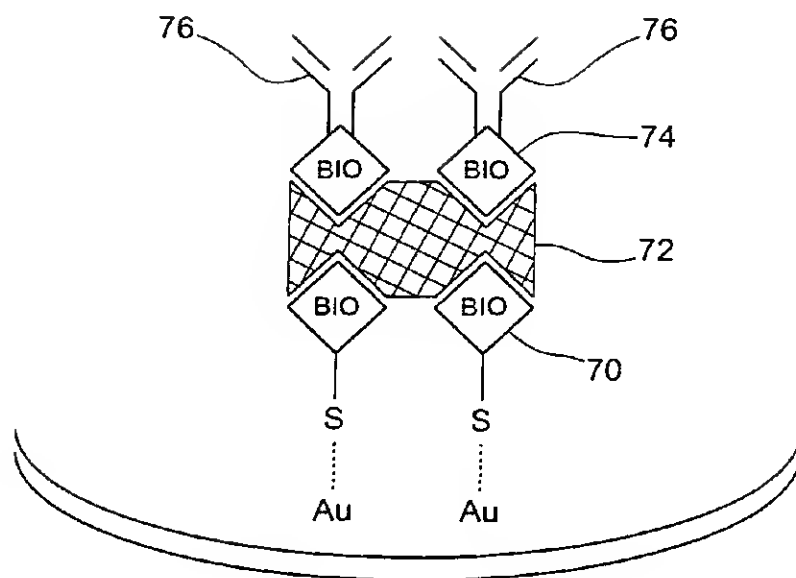


FIG. 7A

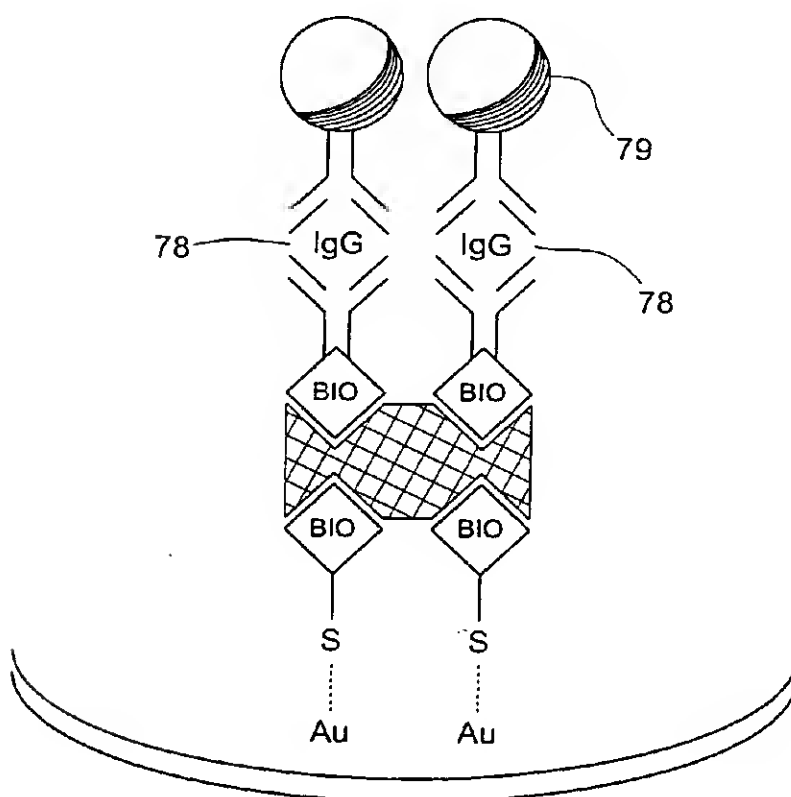


FIG. 7B

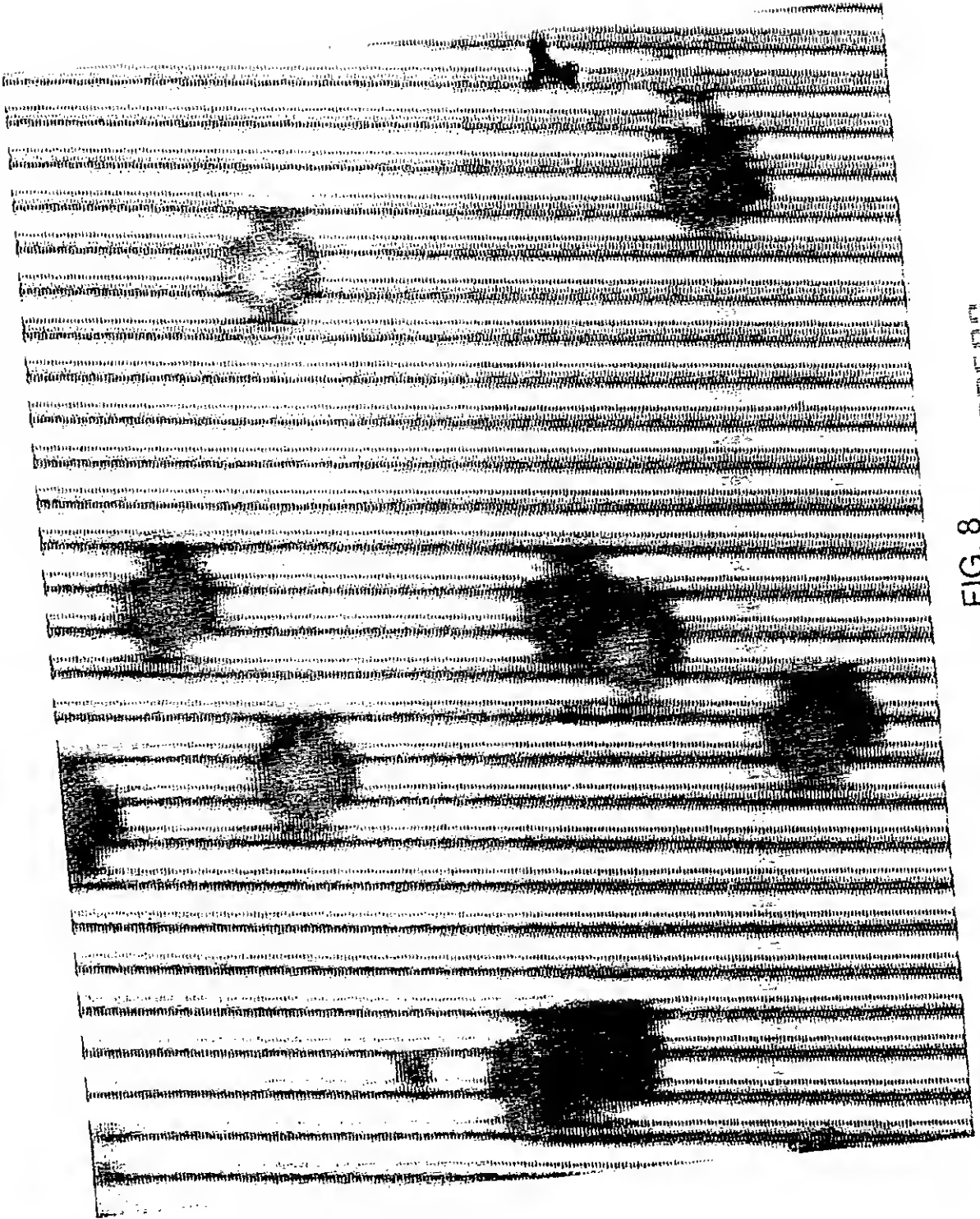


FIG. 8  
ORIGINAL COPY OF PHOTOGRAPH OF THE  
REAR OF THE HEAD OF THE SUBJECT

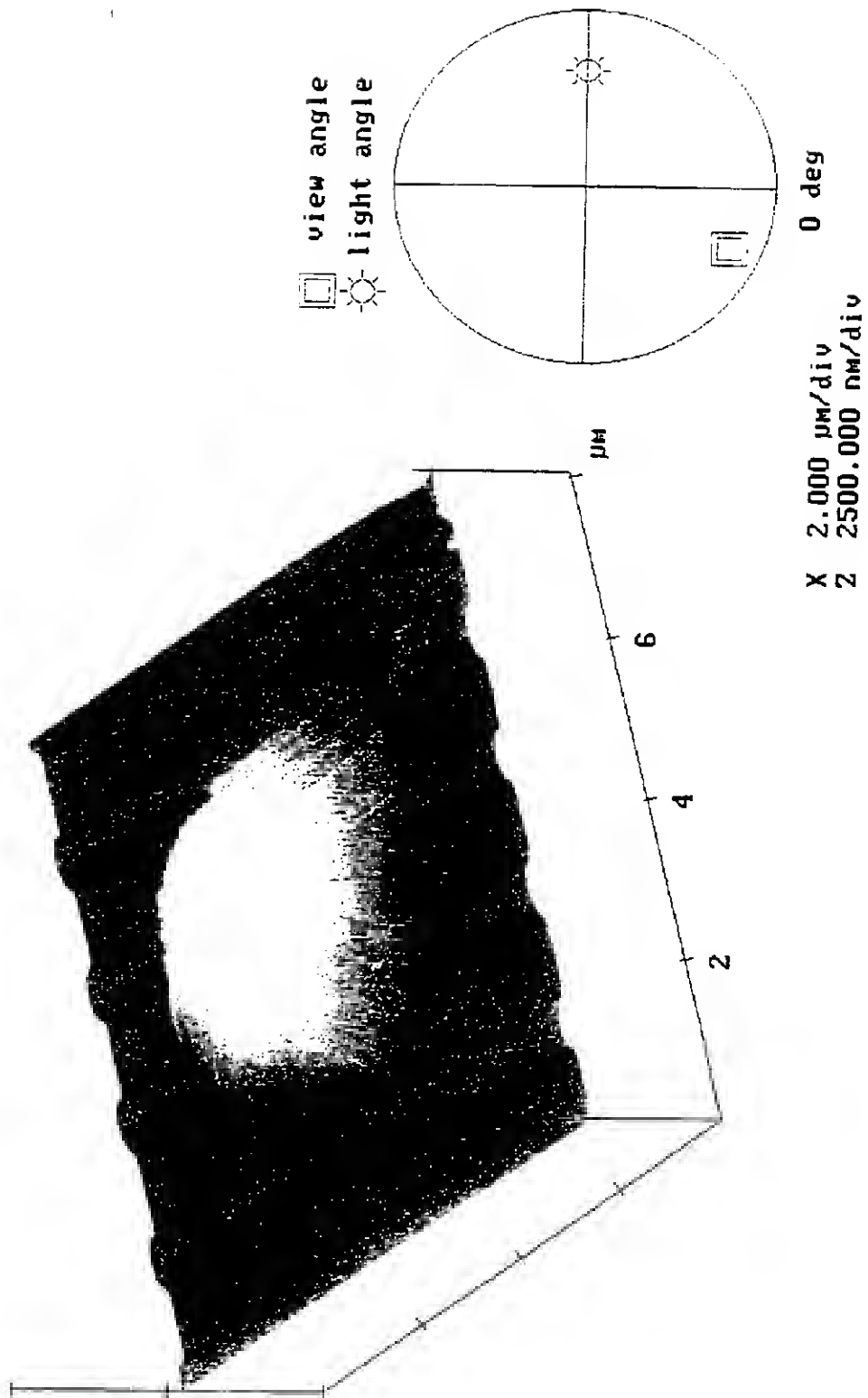


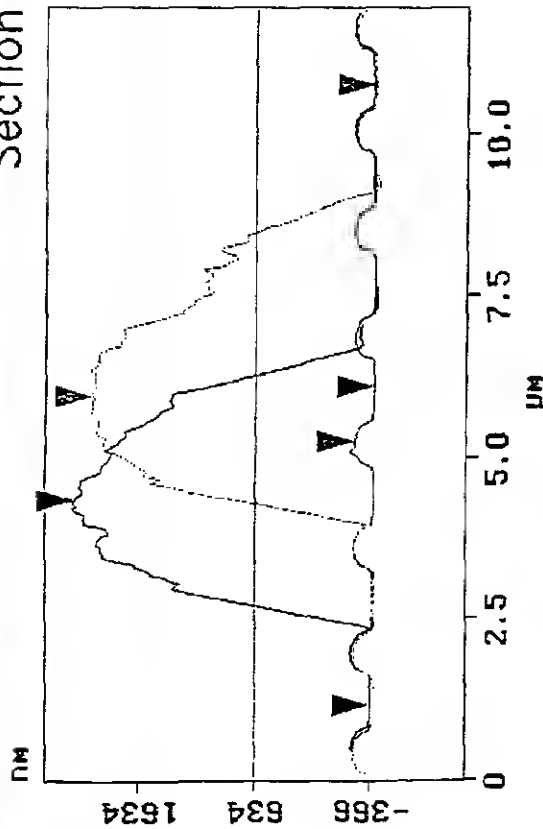
FIG. 9

00121970 102699

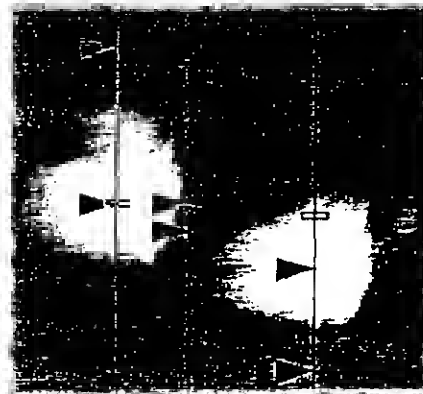
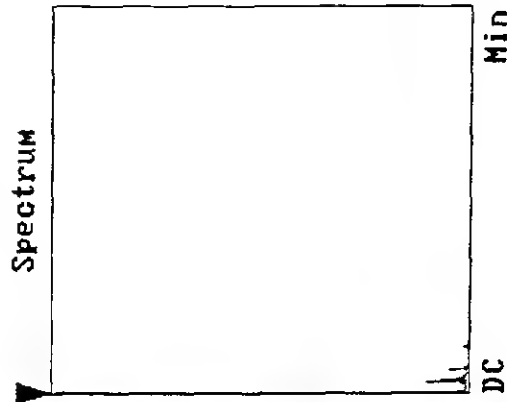


Cursor Marker Spectrum Zoom Center Line Offset Clear

# Section Analysis



L	843.75 nm
RMS	63.849 nm
Lc	DC
Ra(Lc)	27.782 nm
Rmax	97.447 nm
Rz	96.754 nm
Rz Cnt 2	
Radius	450.61 nm
Sigma	62.095 nm



Sphere on Wobble Groove grating.014

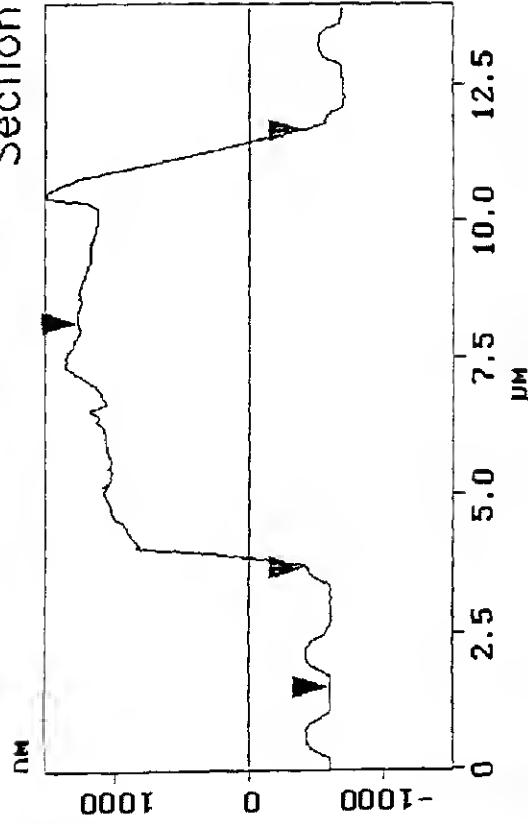
Surface distance	6.867 μm
Horiz distance(L)	4.828 μm
Vert distance	2.445 μm
Angle	26.858 deg
Surface distance	894.27 nm
Horiz distance	843.75 nm
Vert distance	169.96 nm
Angle	11.389 deg
Surface distance	5.302 μm
Horiz distance	3.211 μm
Vert distance	2.568 μm
Angle	38.649 deg
Spectral period	DC
Spectral freq	0 Hz
Spectral RMS amp	461.26 nm

Cursor: fixed 3 Zoom: 2:1 Cen line: off offset: On

FIG. 11

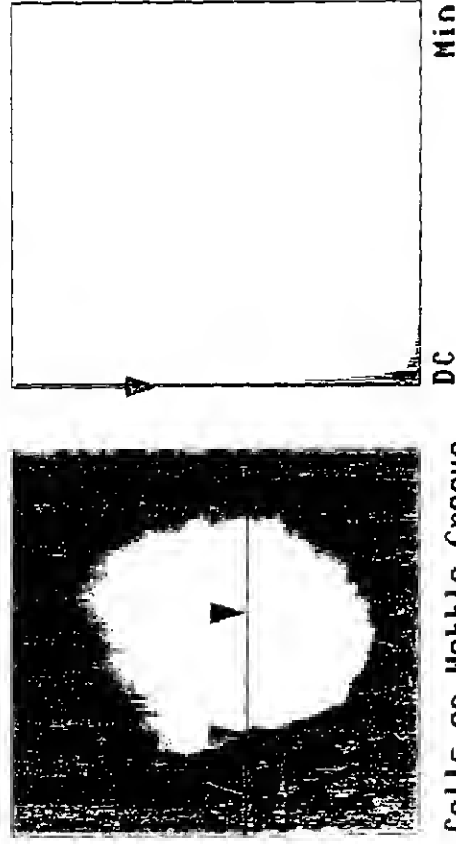
Cursor Marker Spectrum Zoom Center Line Offset Clear

## Section Analysis



L	6.672 μm
RMS	782.05 nm
lc	DC
Ra(lc)	284.31 nm
Rmax	1.187 μm
Rz	868.11 nm
Rz Cnt	4
Radius	3.512 μm
Sigma	426.35 nm

## Spectrum



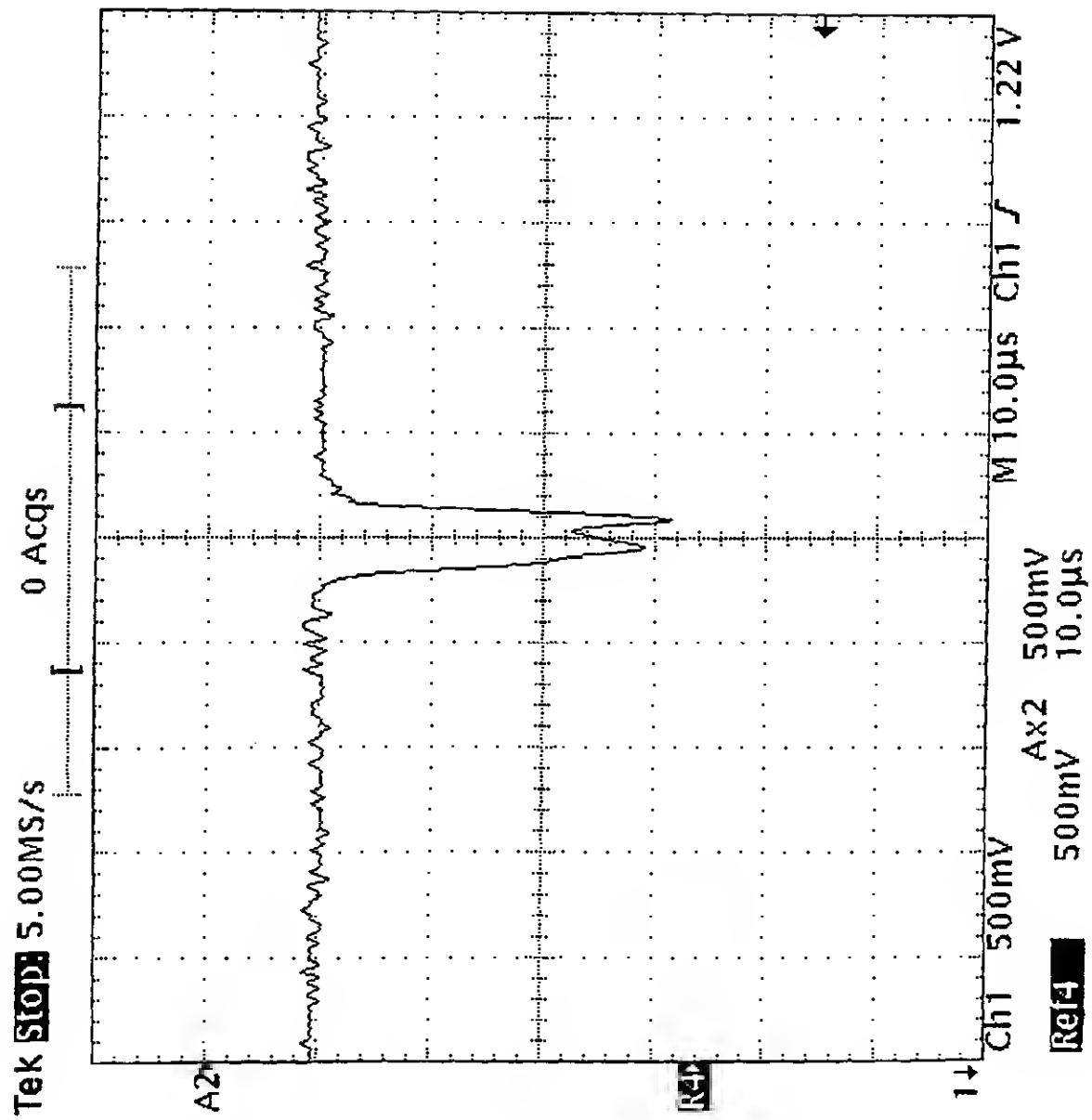
Cells on Mobbie Groove  
grating.016

Surface distance	10.707 μm
Horiz distance(L)	7.984 μm
Vert distance	11.549 nm
Angle	0.083 deg
Surface distance	8.179 μm
Horiz distance	6.672 μm
Vert distance	1.860 μm
Angle	15.575 deg
Surface distance	DC
Horiz distance	0 Hz
Vert distance	493.32 nm
Angle	
Spectral period	DC
Spectral freq	0 Hz
Spectral RMS amp	493.32 nm

Cursor: fixed Zoom: 2:1 Cen line: off Offset: off

FIG. 12

CELLS ON MOBBIE GROOVE  
GRATING.016



**FIG. 13**



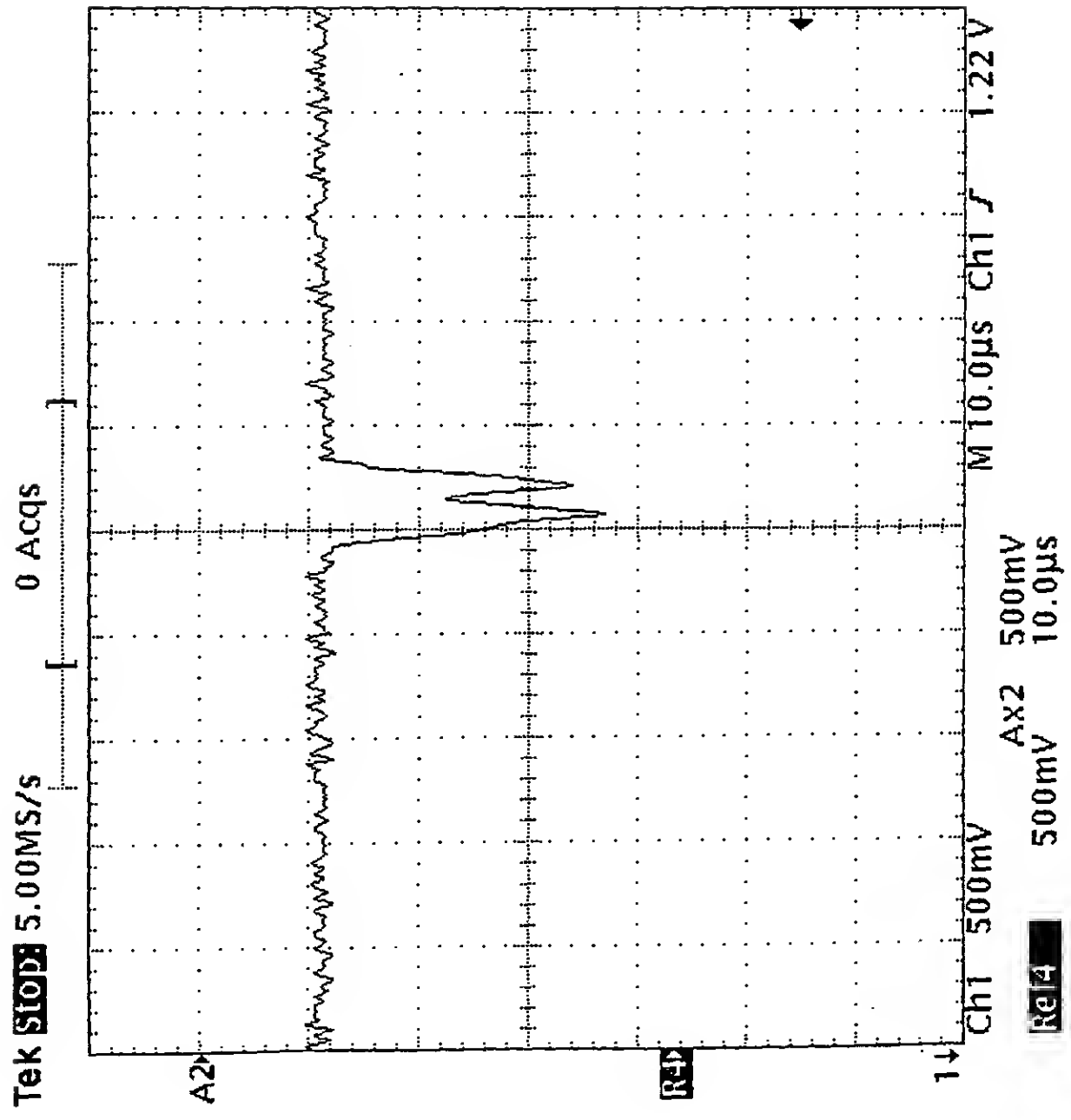


FIG 14

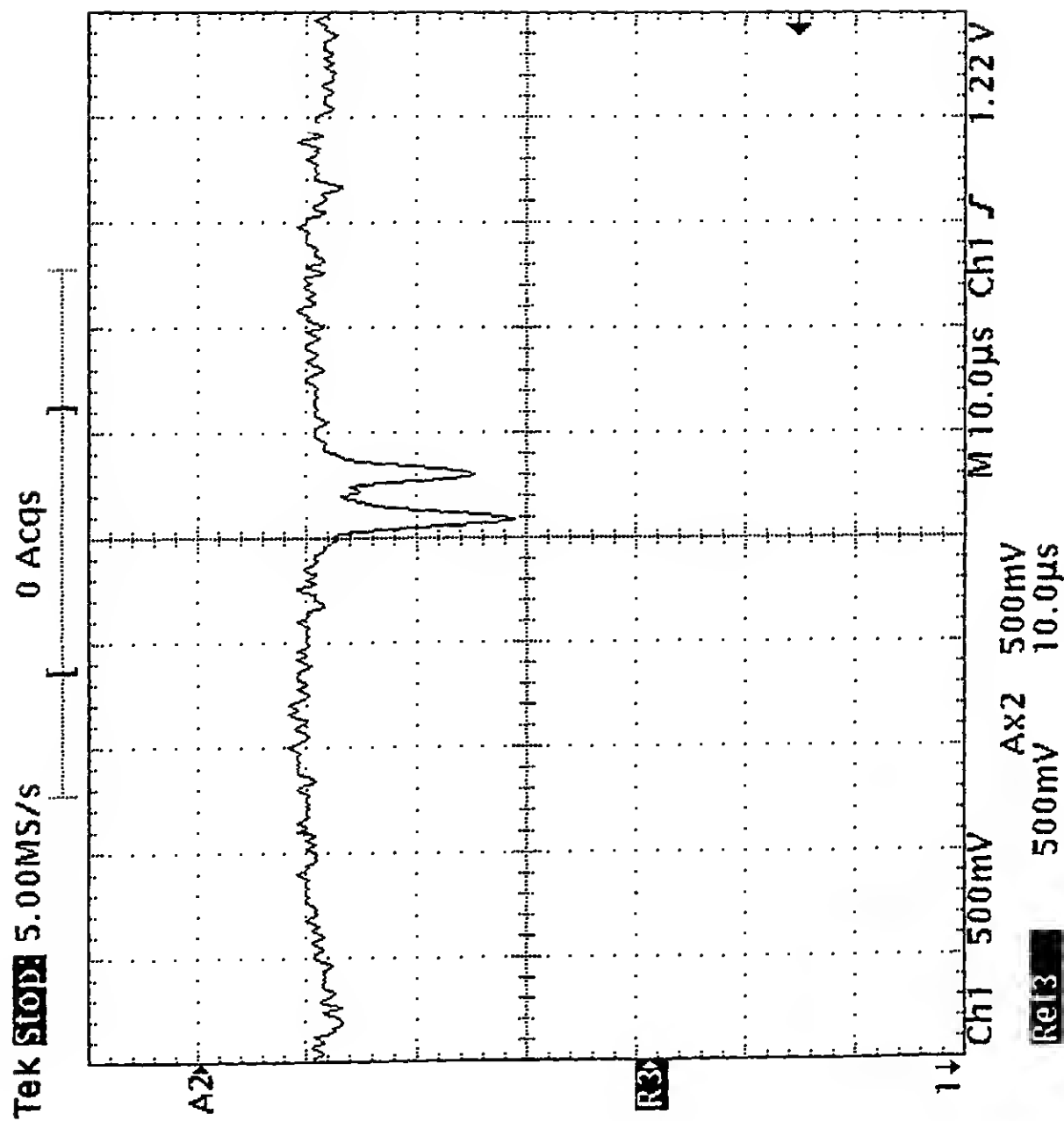


FIG. 15

Copyright 2000 by Analog Devices, Inc.

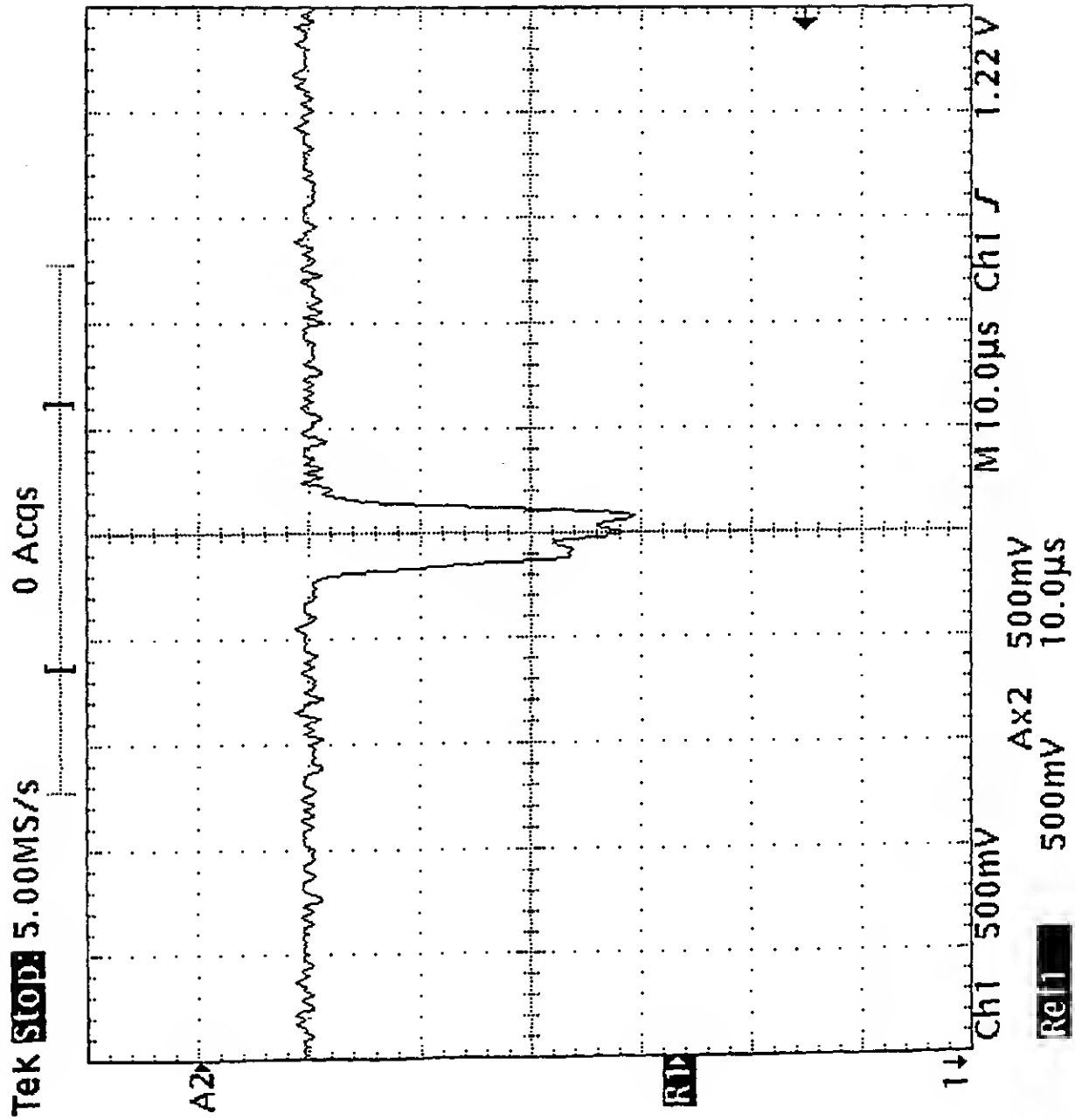


FIG. 16

001131370 102570

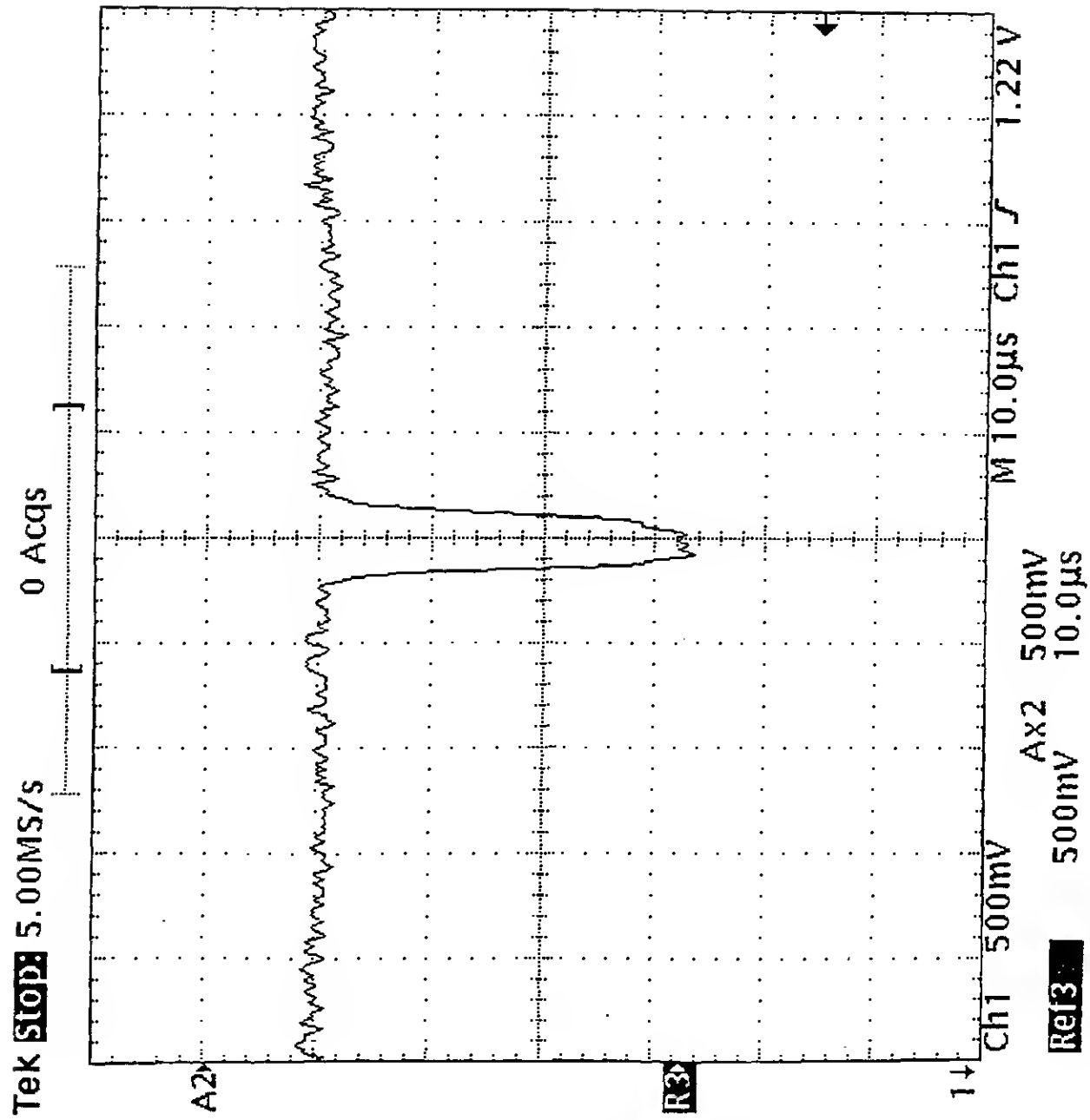


FIG. 17 102572

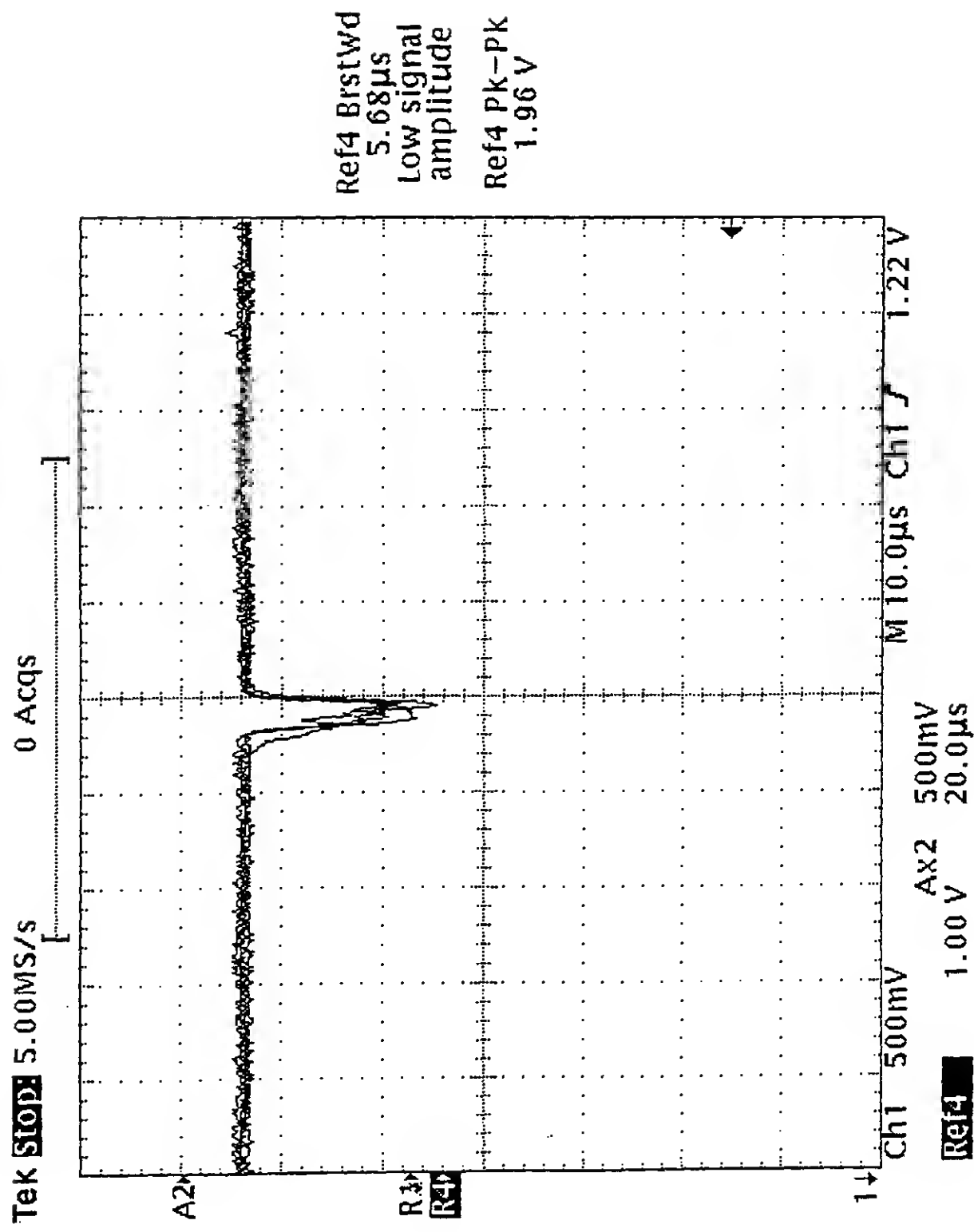


FIG. 18

FIG. 19

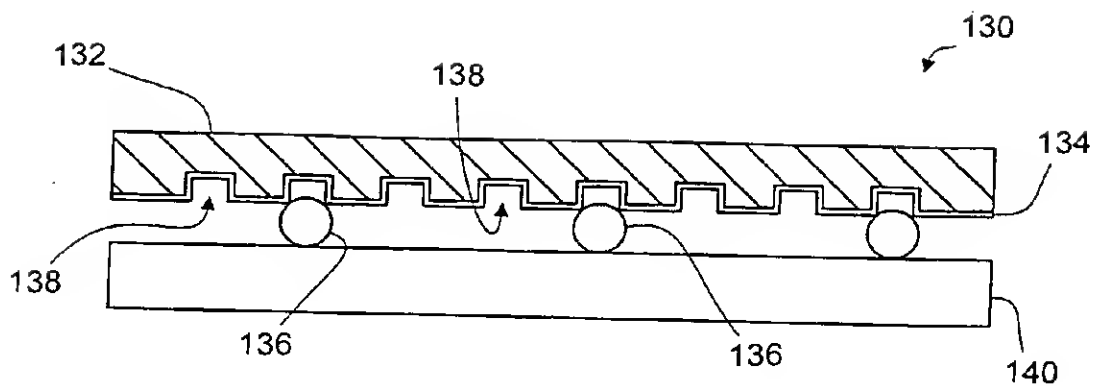


FIG. 20

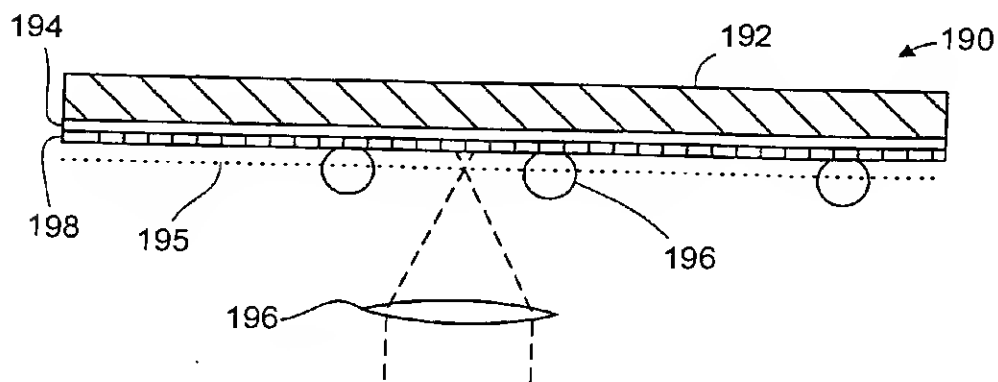
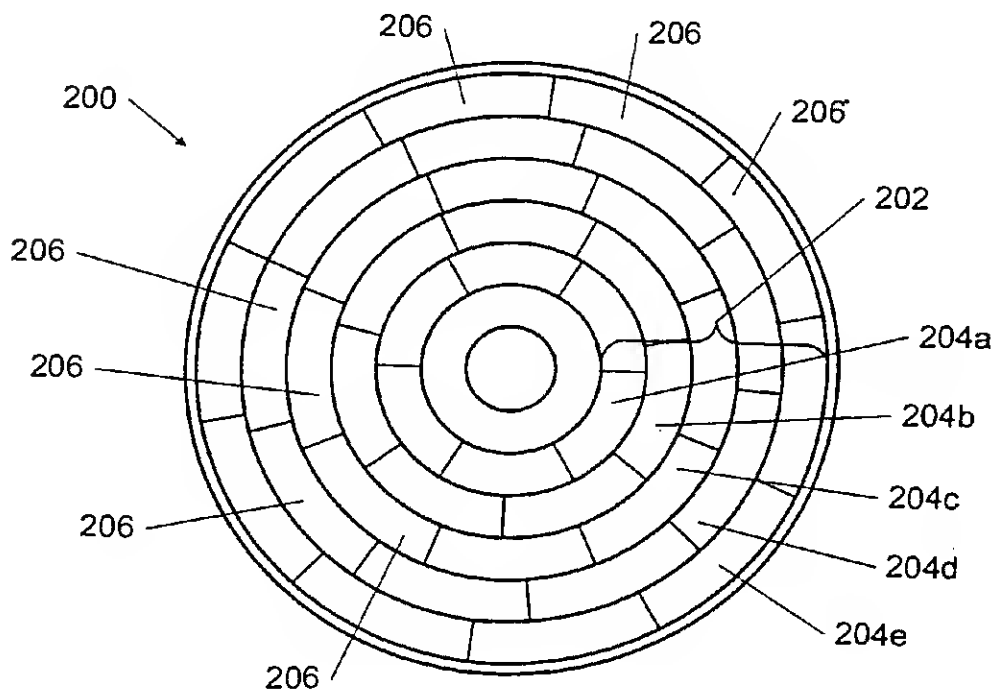


FIG. 21



+

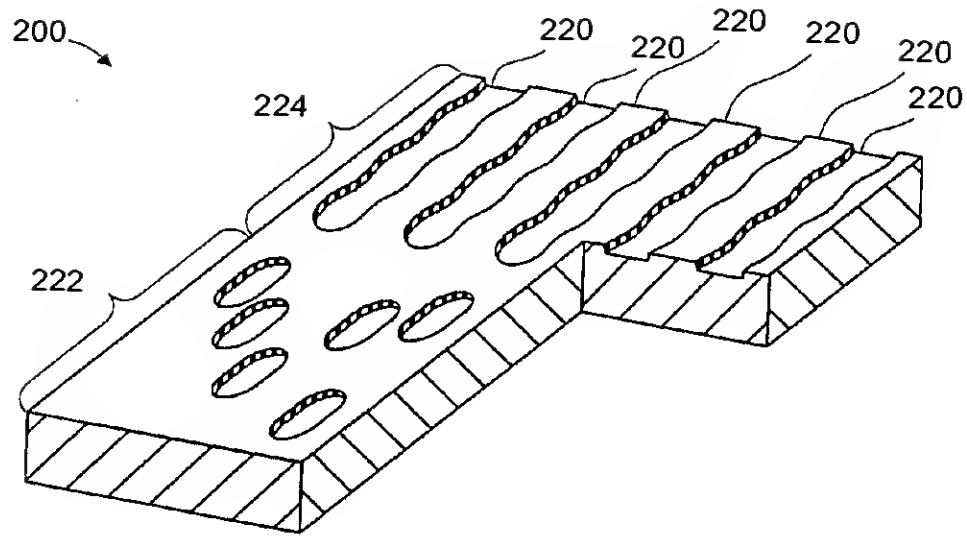


FIG. 22

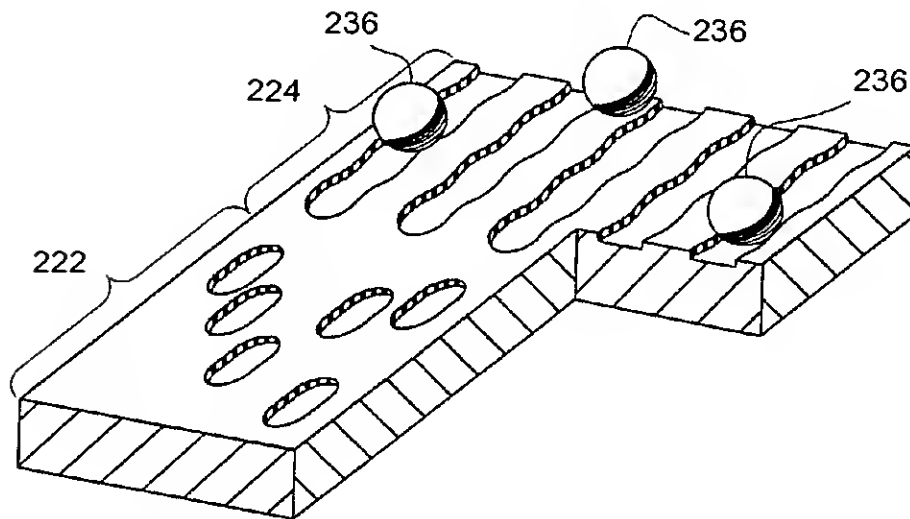


FIG. 23

2025 RELEASE UNDER E.O. 14176

+

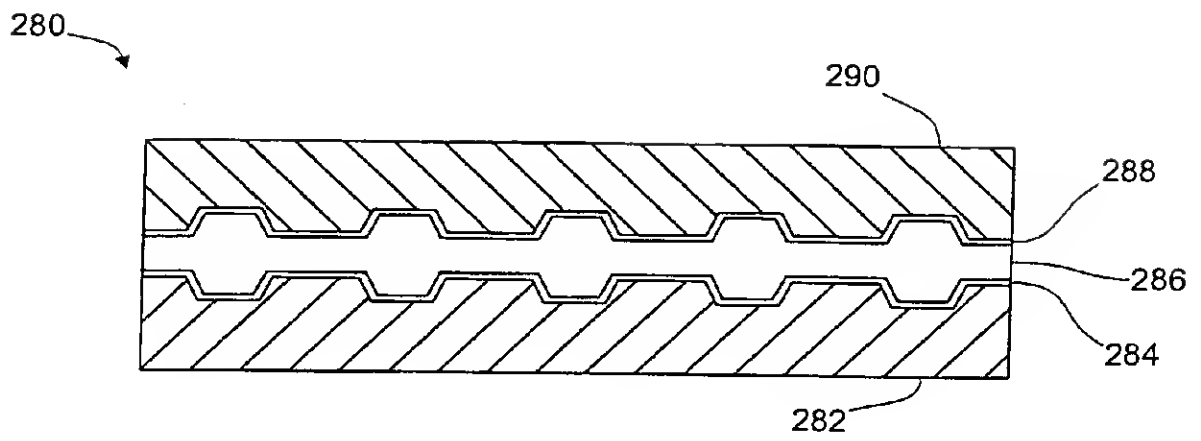


FIG. 24

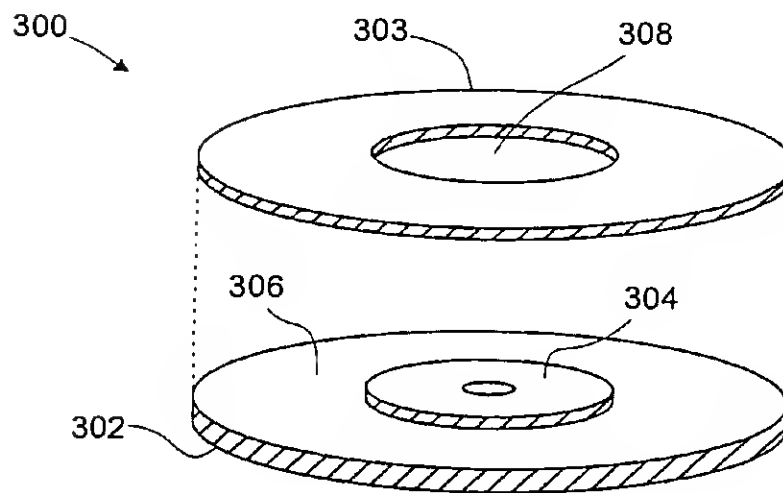


FIG. 25



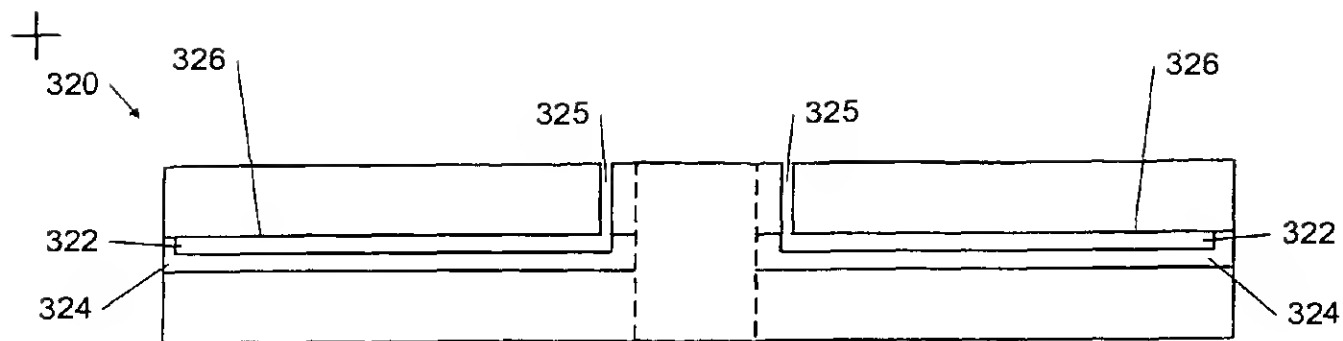


FIG. 26

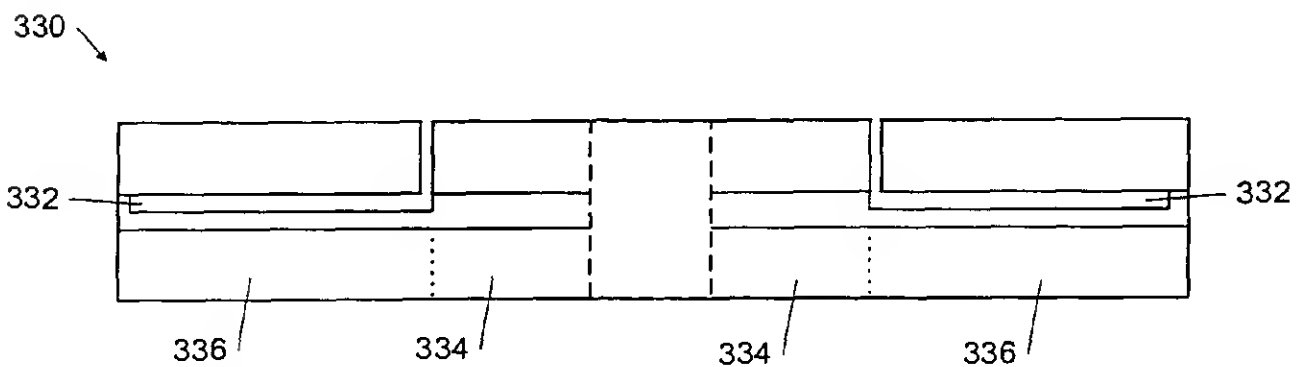


FIG. 27

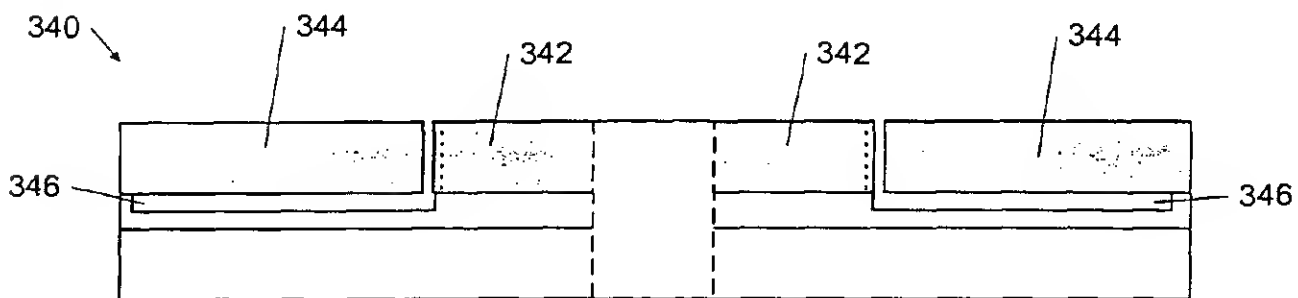


FIG. 28

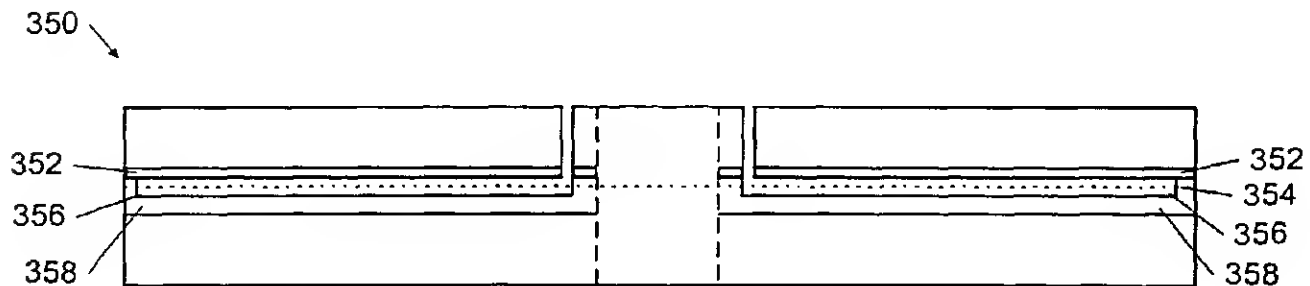


FIG. 29

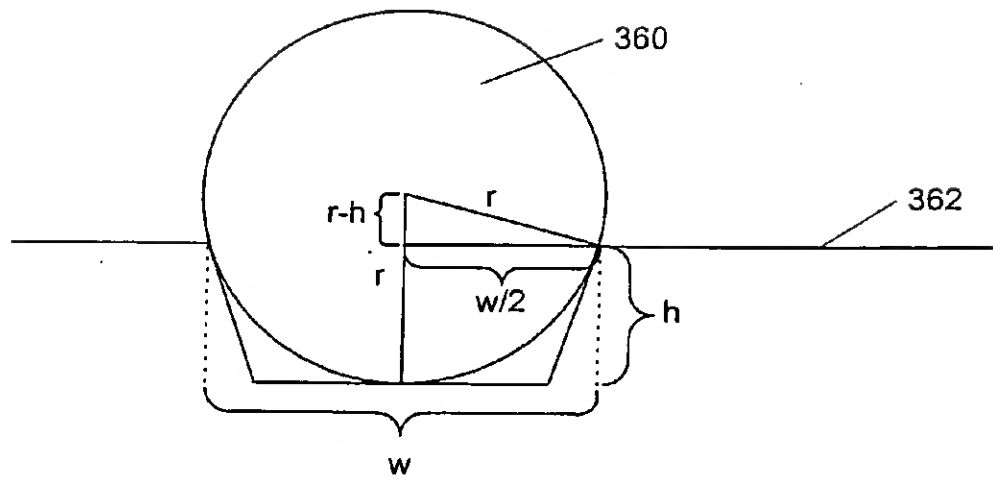
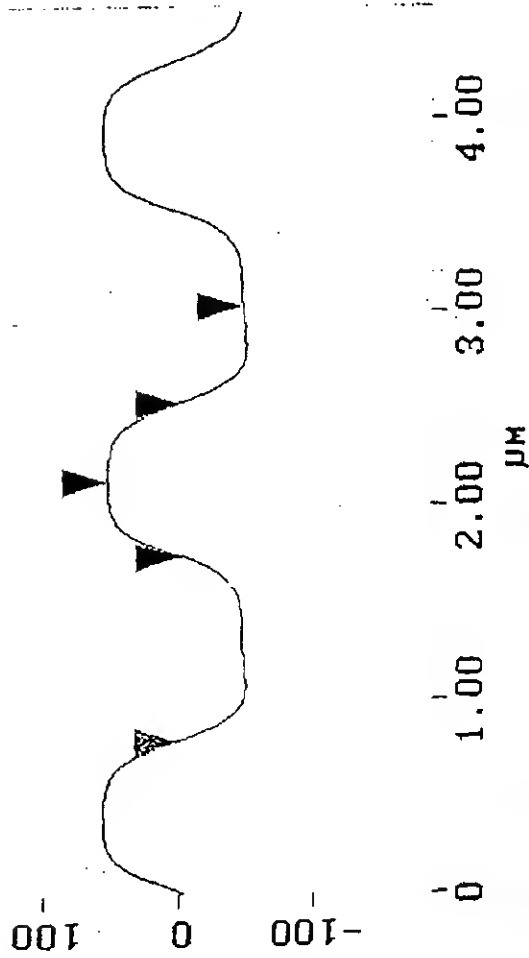
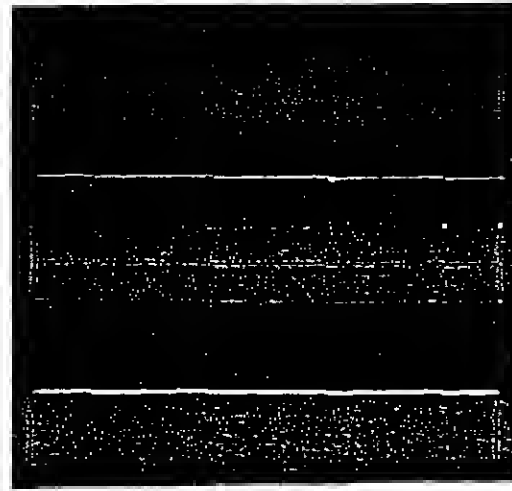


FIG. 30



Spectrum



Min

rm159in.000

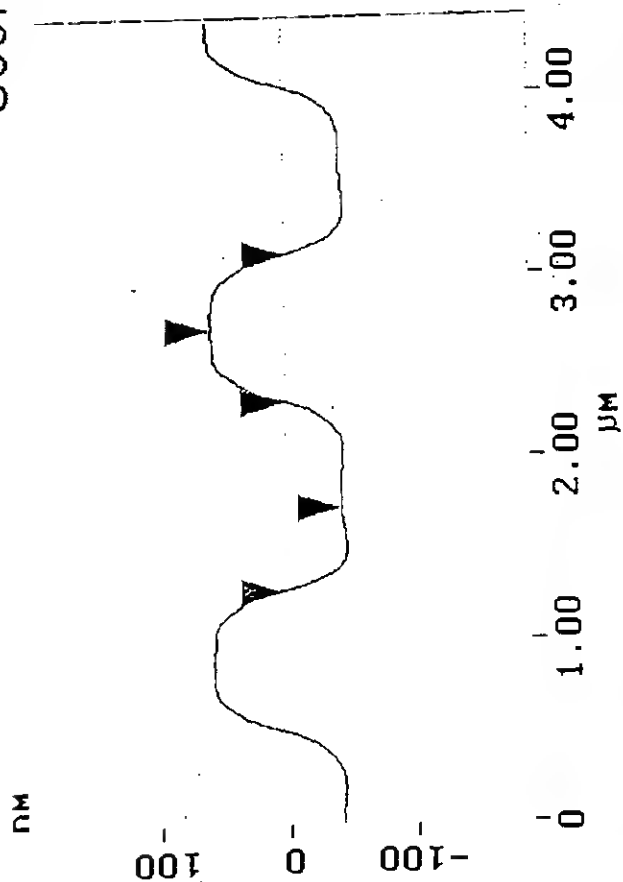
Cursor: average Zoom: 2:1

Cen line: Off Offset: off

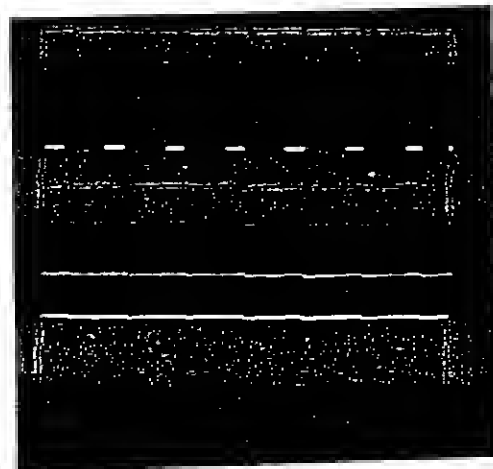
L	800.78 nm
RMS	17.366 nm
Ic	DC
Ra(Ic)	13.284 nm
Rmax	57.853 nm
Rz	57.853 nm
Rz Cnt 2	
Radius	1.427 μm
Sigma	4.388 nm

Surface distance	912.31 nm
Horiz distance(L)	898.44 nm
Vert distance	100.00 nm
Angle	6.351 deg
Surface distance	969.10 nm
Horiz distance	957.03 nm
Vert distance	7.528 nm
Angle	0.451 deg
Surface distance	817.07 nm
Horiz distance	800.78 nm
Vert distance	0.740 nm
Angle	0.053 deg
Spectral period	DC
Spectral freq	0 Hz
Spectral RMS amp	4.523 nm

# Section Analysis



Spectrum



DC Min

rm159out.000

Cursor: average Zoom: 2:1

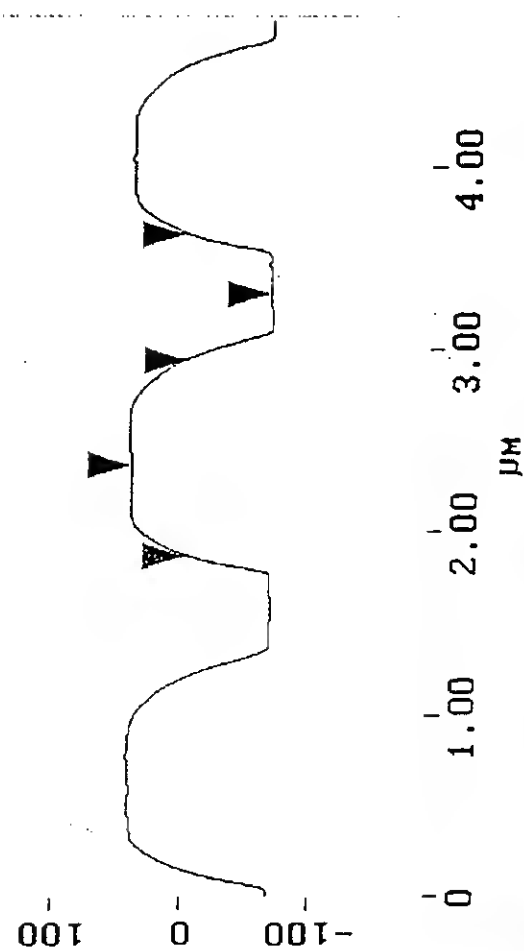
Cen line: off Offset: off

L	820.31 nm
RMS	18.016 nm
Ic	DC
Ra(Ic)	13.505 nm
Rmax	62.560 nm
Rz	61.145 nm
Rz Cnt 2	
Radius	1.431 μm
Sigma	5.174 nm

Surface distance	991.89 nm
Horiz distance(L)	976.56 nm
Vert distance	101.23 nm
Angle	5.918 deg
Surface distance	1.050 μm
Horiz distance	1.035 μm
Vert distance	7.648 nm
Angle	0.423 deg
Surface distance	840.65 nm
Horiz distance	820.31 nm
Vert distance	3.315 nm
Angle	0.232 deg
Spectral period	DC
Spectral freq	0 Hz
Spectral RMS amp	1.189 nm

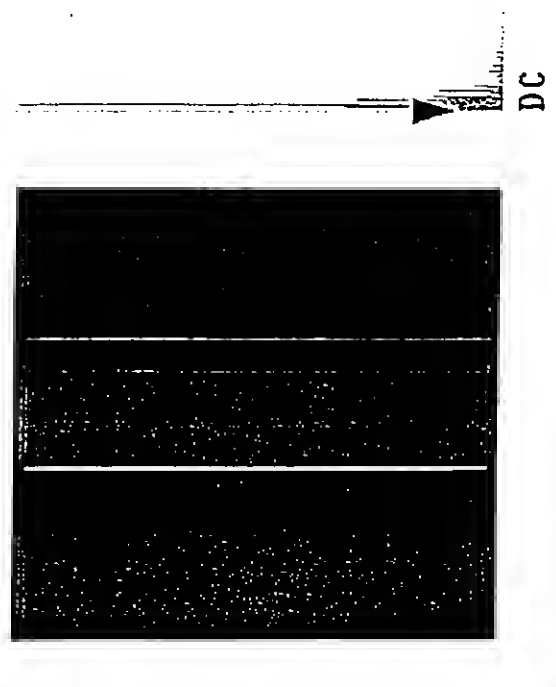
FIG.32  
021121821103500

# Section Analysis



L	683.59 nm
RMS	21.794 nm
lc	DC
Ra(1c)	16.951 nm
Rmax	67.772 nm
Rz	66.682 nm
Rz Cnt 2	
Radius	820.71 nm
Sigma	8.514 nm

## Spectrum



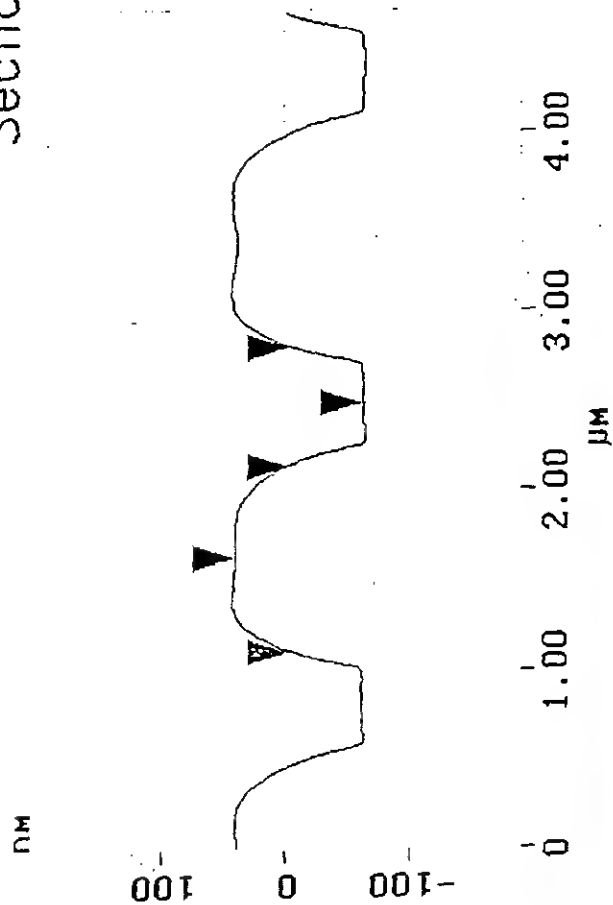
Surface distance	956.26 nm
Horiz distance(L)	937.50 nm
Vert distance	107.52 nm
Angle	6.543 deg
Surface distance	1.084 μm
Horiz distance	1.074 μm
Vert distance	4.127 nm
Angle	0.220 deg
Surface distance	715.65 nm
Horiz distance	683.59 nm
Vert distance	3.943 nm
Angle	0.330 deg
Spectral period	DC
Spectral freq	0 Hz
Spectral RMS amp	3.603 nm

Cursor: average Zoom: 2:1      Cen line: off      Offset: off

FIG. 33

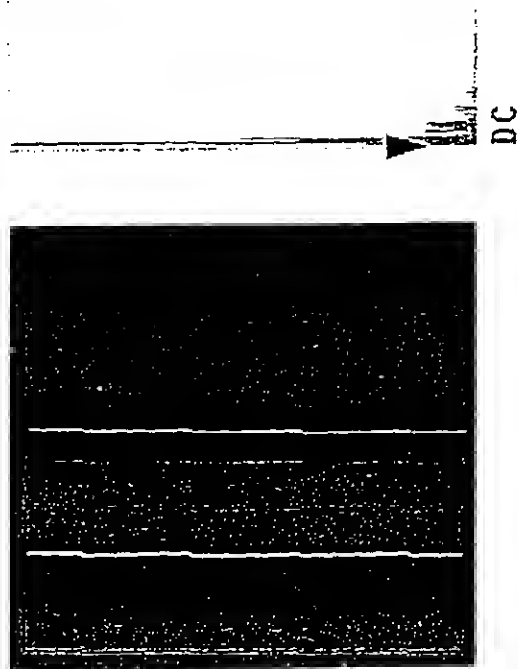
001244870.100000

# Section Analysis



L	664.06 nm
RMS	20.135 nm
lc	DC
Ra(lc)	14.972 nm
Rmax	66.116 nm
Rz	64.871 nm
Rz Cnt	2
Radius	824.44 nm
Sigma	8.988 nm

## Spectrum



Surface distance	878.62 nm
Horiz distance(L)	859.38 nm
Vert distance	102.80 nm
Angle	6.821 deg
Surface distance	1.046 μm
Horiz distance	1.035 μm
Vert distance	4.540 nm
Angle	0.251 deg
Surface distance	695.52 nm
Horiz distance	664.06 nm
Vert distance	2.814 nm
Angle	0.243 deg
Spectral period	DC
Spectral freq	0 Hz
Spectral RMS amp	3.340 nm

m160out.000

Cursor: average Zoom: 2:1

cen line: off Offset: off

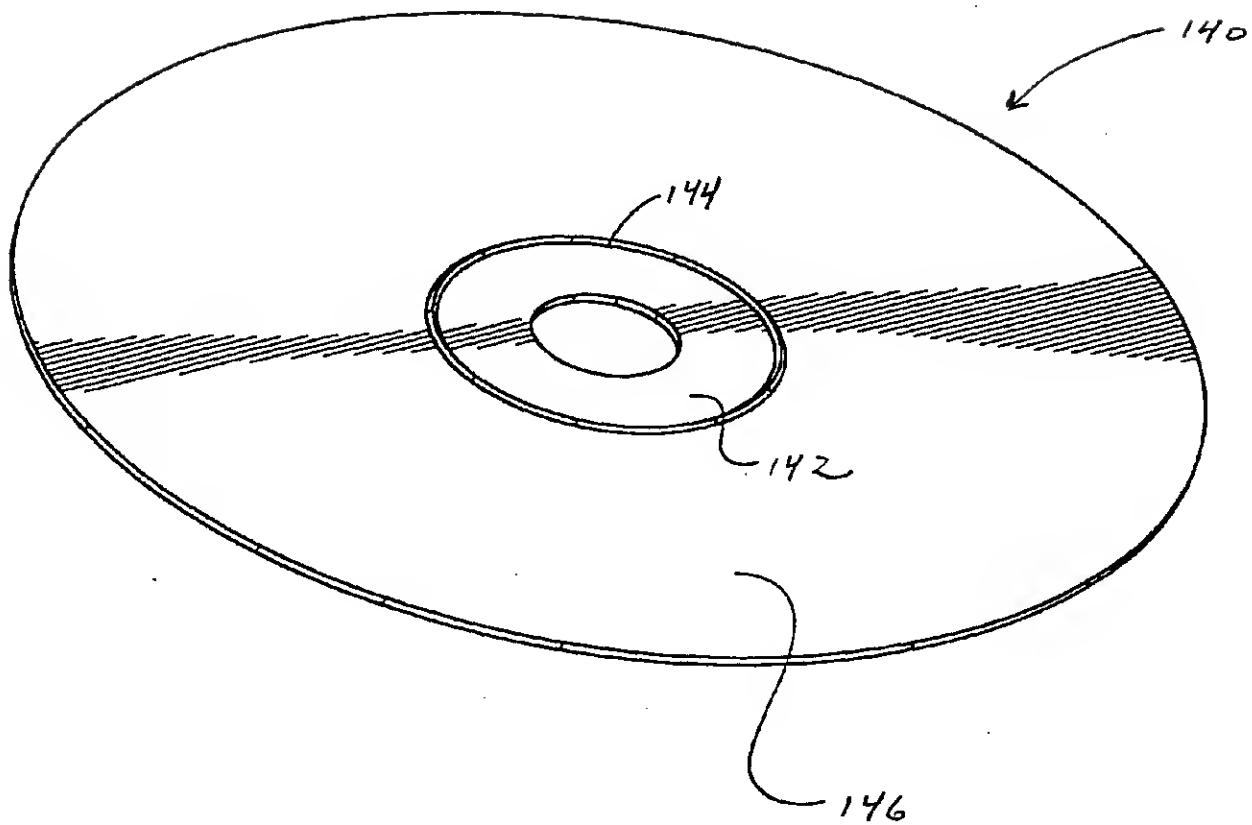


FIG. 35

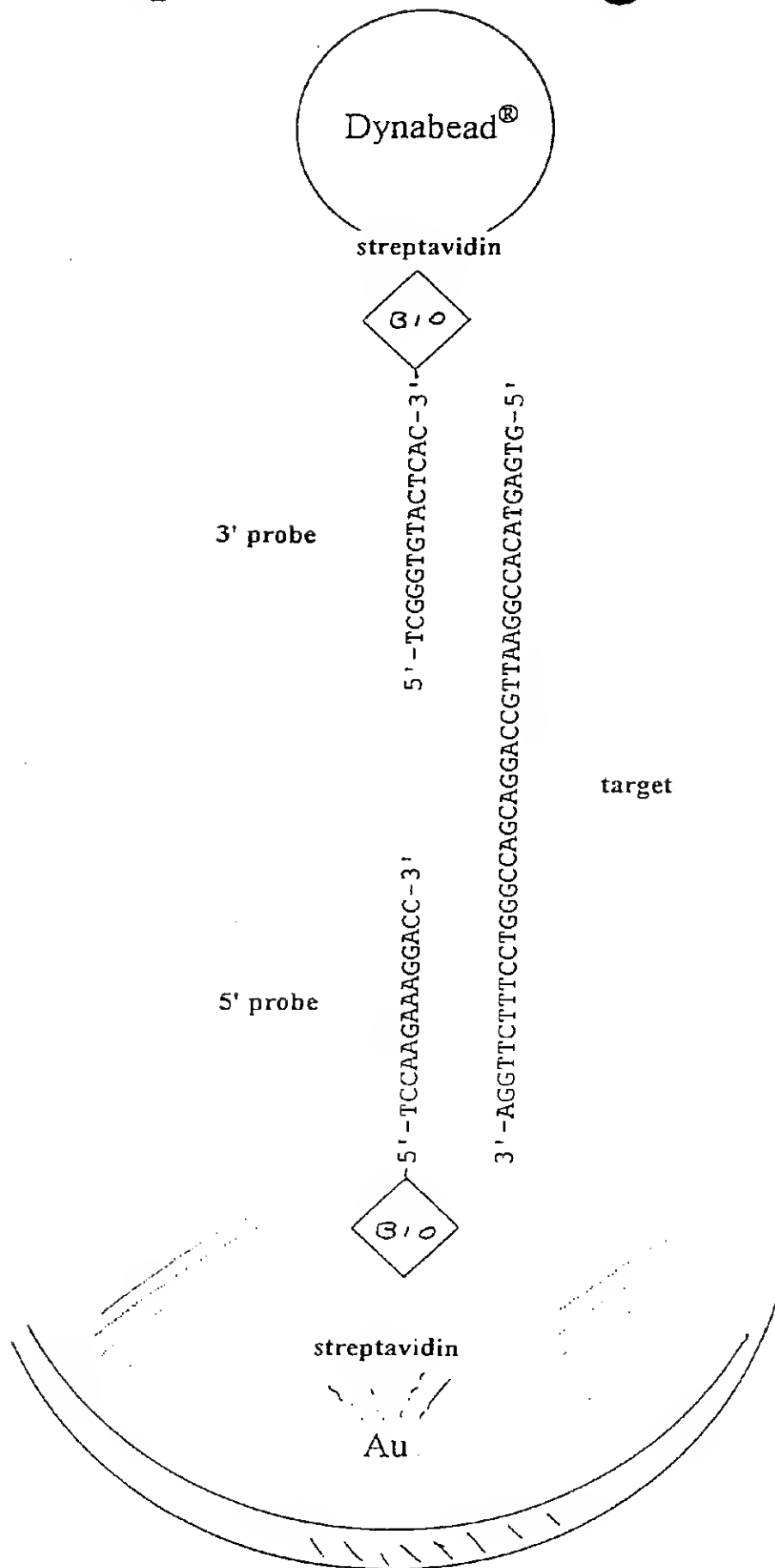
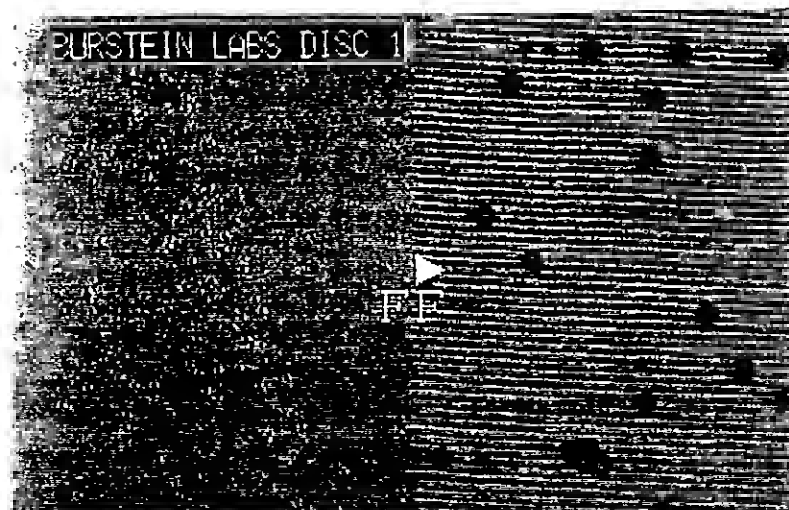


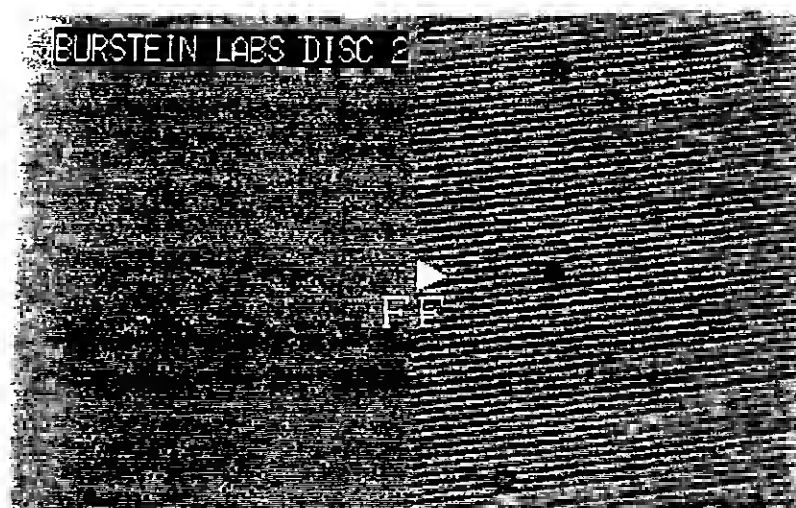
Fig. 36





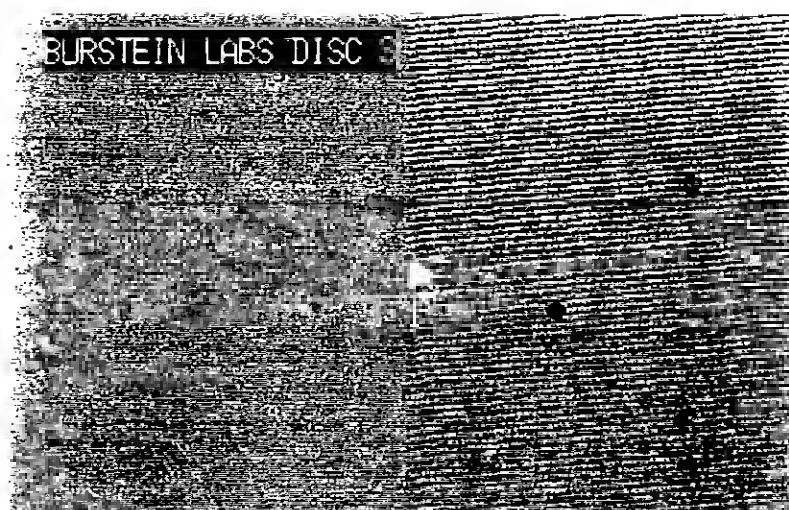
A

20 femtomoles



B

20 attomoles



C

20 zeptomoles

FIG. 37

[illegible]

FIG. 39

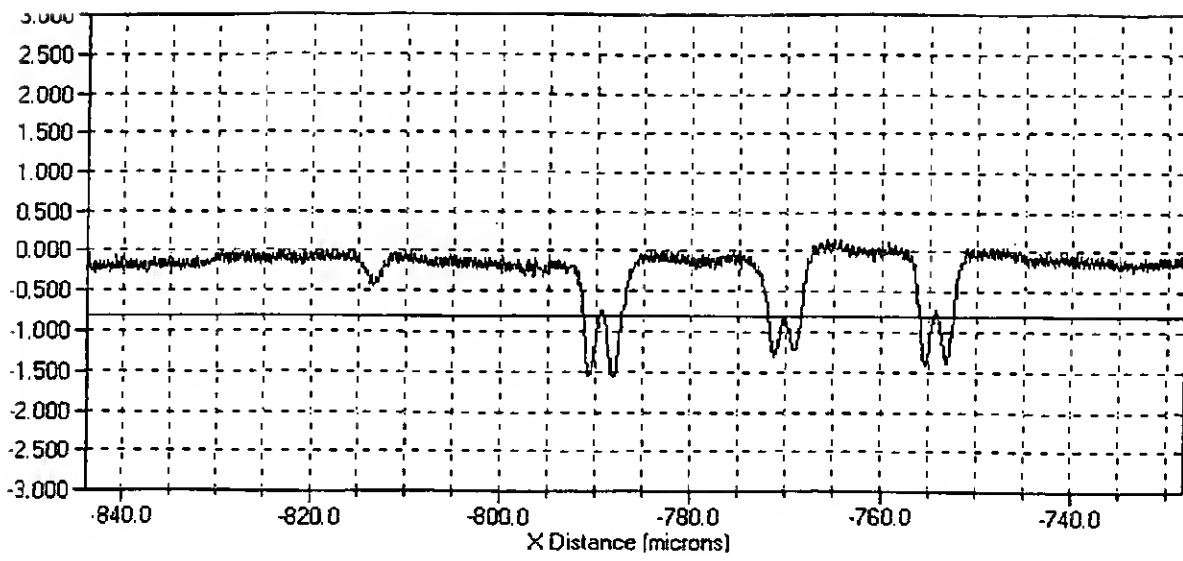


FIG. 40

AWM Muri		Supplementary sheet, mold acceptance test				CD-3-AWM	
Job No.	36-10236	Agent		CR-R	Ram hold	vac + mech	IFPI
SM Order No	9N.96293	Customer		Eximpo CS	Ram dia.	24	Product Code No. 256

<i>Dimensions</i>	0°	90°	180°	270°	Visual faults
0° = mold at top	R15	1.15	1.15	1.15	Streaks
Thickness	R40	1.155	1.155	1.155	Stacking groove
Center hole	15.05 ± 0.03	15.05	Drm. 120 + / - 0.3	mm	Info
<i>Weight in g</i>	Min.	0	15	30	Clouds
Measure every 15 min.	g	15.26	15.27	15.26	Voids
during test	g	15.26	15.26	15.26	Black dots
Max. diff. ± 0.1 g					Matt outer edge
<i>Water in mold</i>	ACTUAL	DESIRED	Tol.		Burrs
Sprue bush	9 ltr./Min.	7	-1/+3		Scratches
Embossor	6 ltr./MIN.	7	-1/+3		Diesel effect
<i>Vacuum</i>	without	with	diff.	tol.	Brown Discoloration
Handling	bar				
Ram	bar				
<i>Mold function</i>		Raw material			<i>Molding compound cold</i>
Embossor	✓	Makrolon 2005	✓		Thickness of cavity (3)
Sprue ejector	✓	Lexan 1020			Venting gap (5)
Ejector sleeve	✓	Panlite 5503			Position of embosser (9)
Sprue bush	✓				Position of spure bush (10)
<i>Air outlet</i>					Embossing stroke
FS dia.	✓				<i>Measuring means</i>
BS dia.	✓				Polarized light
					Halogen light
					Neon Light
					Black (UV Light)
					White paper
					Microimeter
					Balance

**Drawn up by:**

Fig. 41B

Graph 1. Injection - Holding pressure

Cycle illustrated: 533957  
Curve display: continuous

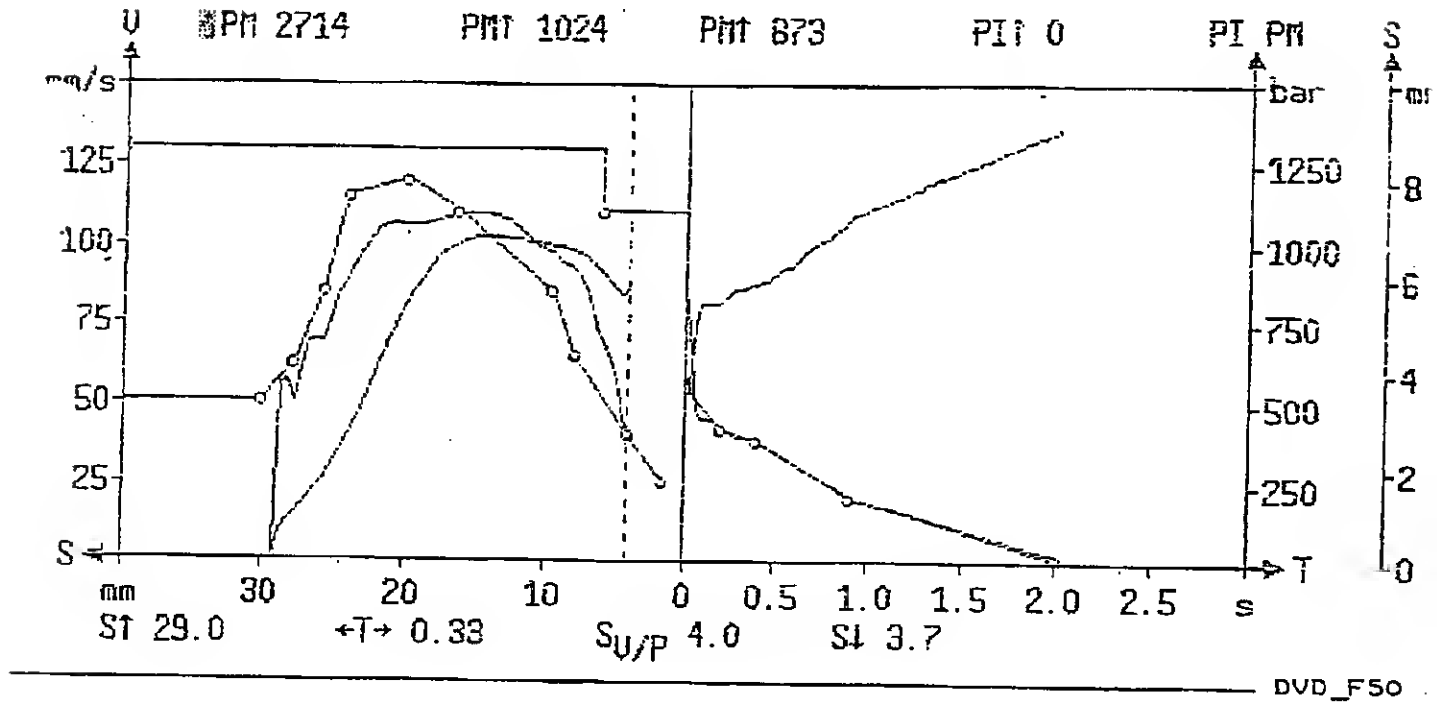


Fig. 41B

Fig. 41C

01.01 Mold movement

Closing movement	V33 = 100%	Closing time S33 =	T32 =	000.
Pressure initiation	V34 = 100%	S34 =		019.0mm 000.7mm
Opening movement	V41 = 100%	Opening time S41 =	T36 =	000.
Braking	V42 = 010%			055.0mm
Pause time	T40 = 000.000 s	Mold position	S640 =	075.
Mold closing pressures				
Closing pressure	P682 = 08.5%			
Pressure build-up	p681 = 020%	T681 =		000.10 s
	E608 = 0	Switched off		

02.01 Summary of mold auxiliary controls/robotics

Enable removal	S680	=	0065.0		
Delays					
Blow off sprue	T602	=	000.03	Sprue blowing time	T603 = 000.1
Advance ejector pin	T53	=	000.10 s		
Transfer stroke forward	T55	=	000.12 s		
Transfer stroke return	T56	=	000.15 s	Extend removal	T668 = 000.2
Emboss forward	T62	=	001.20 s	Emboss return	T63 = 000.1
Blow on nozzle side	T75	=	000.50 s	Nozzle side blowing time	T74 = 000.8
Blow on moving side	T671	=	000.00	Moving side blowing time	T71 = 000.1
Unit forward	T680	=	000.70 s		
Starting program	C683	=	00000	T683 = 000.00 s	S683 = 0004.
Cycle time	T11	=	009.05 s		
Removal time	T640	=	000.70 s		

Fig. 41D:

03.01 Metering									
Screw retraction	C17 = 0	Switched off							
Metering Delay	T20 = 000.50 s	Metering time T21 = 005.9							
Metering stages	C124 = 2								
Metering end point	S23 = 026.0 mm	P23 = 0060 bar	N23 = 100 l.						
	S24 = 029.0 mm	P24 = 0010 bar	N24 = 020 l.						
Holding pressure	P27 = 0010 bar	Start of injection		SO = 029.0					
04.01 Injection									
Enable injection	S682 = 0002.0 mm	Screw position		S641 = 029.0					
Injection values	C121 = 10	Start of injection		SO = 029.0					
	V196 = 0050 mm/s	S196 = 030.0 mm							
	V197 = 0062 mm/s	S197 = 027.6 mm							
	V198 = 0085 mm/s	S198 = 025.6 mm							
	V199 = 0115 mm/s	S199 = 024.0 mm							
	V200 = 0120 mm/s	S200 = 019.8 mm							
	V201 = 0110 mm/s	S201 = 016.2 mm							
	V202 = 0085 mm/s	S202 = 009.5 mm							
	V203 = 0065 mm/s	S203 = 008.0 mm							
	V204 = 0040 mm/s	S204 = 004.0 mm							
	V205 = 0025 mm/s	S205 = 001.5 mm	T2 = 000.3						
	V/P changeover point		S11 = 004.0						
Flow number	S121 = 018.2 mm	S122 = 015.0 mm	C125 = 2776						
Pressure monitoring	Peak pressure		P125 = 01044						
First stage	P101 = 01300 bar	T201 = 00.02 s							
Second stage	P102 = 01100 bar	T201 = 00.02 s	S102 = 006.0						



**Fig. 41E**

#### 04.02 Holding pressure, cooling

Holding pressure values	C122 = 04 P12 = 00550 bar	Changeover point	S11 =	004.0
Holding pressure time Cooling time	P117 = 00420 bar	T117 = 000.20		
	P118 = 00380 bar	T118 = 000.40		
	P119 = 00200 bar	T119 = 000.90		
	T39 = 005.30 s	T120 = 002.00		
Melt cushion monitoring Upper limit	S219 = 010.0 MM	Melt cushion Lower limit	S19 = S119 =	003.7 000.5

### 05.01 Nozzles, unit, purging/dry cycles

Standstill monitoring	C606 = 60 min	C640 = 0004 min	
Unit			
Unit forward	T680 = 000.70 s	V29 = 030 %	
Lift	T30 = 000.30 s	V30 = 050 %	
Unit set-up and manual movements			
Move forward	V816 = 030 %	Lift V806 = 030 %	
Purge/dry cycle/clean			
Number of metering strokes	C16 = 20	C201 = 50	
Metering	S16 = 028.0 mm	P16 = 0060 bar	N16 = 200
Injection	S18 = 001.5 mm	V101 = 05 mm/s	
Delay for purging	T606 = 000.00 s		

# Fig. 41F

## 06.01 Temperature control, plastifier zones/temperature control devices

Zone/description	Set point	Actual value	Reduced	Tolerance		Heating outputs	Cooling
				minus	plus		
10 Melt temperature	310 •C	305 •C	180 •C	040 •C	040 •C		
30 Nozzle	330 •C	330 •C	180 •C		040 •C	014%	
13 Nozzle	315 •C	315 •C	180 •C	040 •C	040 •C	025%	
Cylinder head	310 •C	310 •C	180 •C	040 •C	040 •C	008%	
15 Compression	305 •C	305 •C	180 •C	040 •C	040 •C	005%	
16 Compression	305 •C	308 •C	180 •C	040 •C	040 •C	006%	
18 Feed	300 •C	295 •C	180 •C	040 •C	040 •C	070%	
20 Inlet	060 •C	060 •C	060 •C	040 •C	040 •C		024

Zone/description	Set point	Actual value	Reduced	Tolerance		Heating outputs	Cooling
				minus	plus		
24 Heating/cooling device	112 •C	093 •C	050 •C	020 •C	020 •C	000%	000
25 Heating/cooling device	114 •C	091 •C	050 •C	040 •C	020 •C	000%	000

## 08.01 Disk transfer

Peripheral interface	C684	=	0	Without signal acknowledgement	
Buffer switch-off size	C680	=	65000		
Production delay	T682	=	001.00 s		
Max. transfer time	T601	=	001.00 s		
			C605	=	0
					With interruption of cycle

Fig. 41G

09.01-Production control						
Application	C340	= 2	No application			
Data set number	C315	= 100				
Production sequence						
Item number	C303	= 1	Piece counter Cycle counter	C324 C325	= =	29270 29270
Cycle time	T11	= 009.05 s	Failure rate	C718	=	30.56%
Production preparation			Reason	C357	=	00
10.01 Process statistics						
Q monitoring	C340	= 2	Monitoring without screening out			
Q report	C700	= 0	No report			
Total	cycles of which					
Random sample	C325	= 29270	out of tolerance	C318 = 8946	failure rate	C718 = 30.56%
	C326	= 29269		C338 = 8946		C738 = 30.56%
Process variables	Set Point $\bar{x}$	Tolerance +/-	Actual Value $\bar{x}$	Mean $\bar{x}_q$	Scatter $3s$	Out of Tolerance
Metering time	1.20	0.30	5.98 s	2.32	5.408	-06786
Injection start	30.1	2.0	29.0 mm	28.6	0.82	2028
Injection time	0.47	0.20	0.33s	0.39	0.105	0
V/P changeover point	3.5	1.0	4.0 mm	4.0	0.04	0
Melt cushion	4.2	1.0	3.7 mm	3.8	0.25	0
? peak value	600	200	871 bar	682	99.9	-06566
? peak value	0		0 bar	0	0.0	
Flow number	2500	300	2776	2441	99.9	359
Cycle time	3.90	0.50	9.05 s	5.08	6.421	-06570

Fig. 41H

10.02 Configuration of the quality monitoring

Reaction: Process data outside tolerance  
Switch-off behavior    C703 = 0    no reaction

10.03 Q report intermediate store

Manufacturer  
Machine No.    DVD\_F50

Job data

**Fig. 41 I**

## 16.01 System characteristics

Machine data		DISCJET 600/110		Order number		DVD_F50	
Machine type		PAC 13.54		IMC 12.26		CEL 10.31	
Control version		DB 05.80		Date created		23.10.1996	
Database version		350400		Version		17106	
Special							
Mold data							
Installed height		S90 = 160.0 mm		Identification		C806 = 024	
Plasticizing		Ram nominal diameter		S801 = 032.0 mm		Max. metering stroke	
		Max. permissible melt pressure		PB00 = 01482 bar		Max. specific melt pressure	
		Max. permissible backpressure		P801 = 0317 bar		C804 = 0024	
						S802 = 100.0	
						P802 = 01482 bar	
Temperatures		Set point/actual value		Tolerance +/-		Heating	
Cabinet		TH1 = 035 026 °C		030 °C		010 °C	
Oil		TH2 = 050 051 °C		041 °C		011 °C	
						000%	
						005	